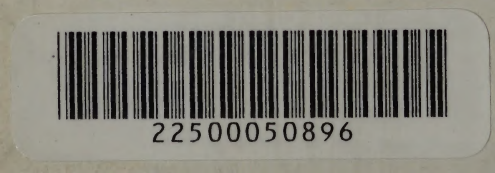
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OVARIOTOMY IN THE COW AND THE MARE.

BY SIMON J. J. HARGER, V. M. D.,
Professor of Anatomy and Zoötechnics, Veterinary Department, University of Pennsylvania.

Historical.—Extirpation of the ovaries of our female domestic animals is one of the oldest operations in veterinary surgery, having been practiced contemporaneously with ovariotomy in woman. It is described by the ancient scientific writers as well as in modern veterinary works. Already in the time of Pliny (1st cent. A. D.), Varro (1st cent. B. C.), and Aristotle (4th cent. B. C.), was it practiced in the female camel, cow, mare, sow and ewe. Little was said about it during the Middle Ages. The more modern writings on the subject date back to the seventeenth century, when Bartholdi in his "Briefen über die Medicin," 1662, speaks of spaying mares and cows through the flank, which was then a frequent practice in Denmark. In France it had been performed on mares and cows, but was prohibited in the former by a special law in the beginning of the eighteenth century. According to the royal edict of January 22, 1717, ovariotomy on mares belonging to government studs, corporations and other private individuals, at whatever age, was forbidden, unless by a special privilege from the "government commissioners," under penalty of fifty francs, one-half going to the informer, the other half to the nearest hospital. Brugnone (1787) gives a short account of the operation by removing the ovaries through an abdominal incision close to the median line, and recommends especially

that it is followed by the best results in the young animal, eight to twelve months old.

At the beginning of the present century (1802), Delabère-Blaine described the flank operation, and recommends it during the first month of pregnancy, because the gravid uterus will facilitate finding the ovaries. Thirty years later, Thomas Wein demonstrated the influence of ovariotomy on the increase of the milk secretion. Charlier, in 1850, recommended the vaginal operation, and invented a complicated set of instruments which he considered necessary for this purpose. Colin simplified this method. In a valuable paper on this subject, in reference to cows, read in 1858 before the Société de Médecine Vétérinaire, he indicated as a most important fact the dilatation of the vagina a few moments after introducing the hand, which would render the use of Charlier's vaginal dilator unnecessary. Hürlimann, in 1886, in a series of experiments on cows, removed the ovaries after ligating their attachments with silk. Delamatte, in 1889, published a practical treatise on antiseptic ovariotomy in mares, citing a large number of cases, some for experimental, others for therapeutic purposes. Ostertag and Hoffman, in the same year, also experimented on this subject. Among other writers may be mentioned Levrat, Régère, Prangé, Mansuy, Degive, Trasbot, Peuch, Bang, Vennerholm, Richard, Thomassen, Lanzillotti, Hendrickx and Mathis.

The favorable results of Thomas Wein, Régère, Levrat and others of removing the ovaries through the flank have made little impression on veterinary surgery, and, since Charlier's operation has become feasible and improved by Colin, the latter method is generally preferred. It was considered most dangerous in the mare. The excessive sensibility of the peritoneum in the horse was always synonymous with a grave prognosis. But, since the era of antisepsis, abdominal operations are less fatal, and have met with such success that the fear of opening the abdominal cavity in man and animals has disappeared. To-day the dogmatism of unsuccessful operators is steadily waning and will soon be forgotten. The peritoneum in the various domestic species, without doubt, has different degrees of sensibility; experience shows that its susceptibility to inflammation is not of such magnitude as has been generally supposed a half a century ago, or as is even

believed by some at the present day. The facts which will follow upon this point in the course of this article, and a subsequent one, are very interesting.

Cadiot,[1] for example, in demonstrating castration of cryptorchids, opened the abdominal wall external to the inguinal canal ; soon after getting up, the horse showed colicky pains, uneasiness, and after throwing himself down a loop of intestine about 40 cm. long was forced through the wound, and after careful antiseptic cleansing was replaced. The horse recovered. In August of last year, while spaying a mare, using a carbolic acid solution made by an assistant, and sufficiently concentrated to scald the skin, hand and instruments were twice dipped into the solution, and as often passed into the abdominal cavity for about fifteen minutes. The patient evidenced slight pain, but no other symptoms. Again in extirpating intra-abdominal champignons or scirrohus cords, which extend high up into the abdominal cavity, the latter with the peritoneum has been opened, sutures inserted into the external wound, and still the patient may make a good recovery. Many veterinarians are familiar with good recoveries following extensive lacerations of the abdominal muscles from traumatisms with eventration of the intestines. Many more instances of this nature could be cited to show how over-estimated is the presumption that the peritoneum of the horse is a "noli me tangere," but the above will suffice ; on the contrary, it possesses a certain degree of immunity against inflammation. A clean, antiseptic hand can always be introduced without danger into the peritoneal cavity.

Indications.—There is only one principle indication for ovariotomy in the mare : that abnormal manifestation of the sexual instincts, the irresistible and insatiable desire for the male, which is called *nymphomania*, and when less characteristic is very incorrectly designated *hysteria.* The nymphomanic mare is very irritable during her menstruations, which are copious, frequent and prolonged ; when touched she moves to and fro, lays down her ears, "turns her tail," attempts to urinate, and spasmodically ejects small quantities of light-colored, slimy urine from the vagina, which has given her the designation "pissy ;" she stamps with her feet, rubs her hind-quarters

[1] The author acknowledges his reference to "De l'ovariotomie chez la jument et chez la vache," by P. J. Cadiot.

against the stall, attempts to bite, strike and kick, and assumes an offensive attitude, as if enraged; the vulva with its reddened, infiltrated mucous membrane is continually and spasmodically opened, protruding the red, congested and swollen clitoris. The disease makes her susceptible of injury to horses in adjoining stalls, as well as to the attendants; in harness they are stubborn, and injure themselves on the shaft or the pole, or their mate by kicking. Pulled with the bridle, touched with the lines, the whip or the spurs, they become unmanageable, kick or attempt to unseat the rider. Served by the stallion, even repeatedly, pregnancy, as a rule, is the exception; even if in foal, abortion generally soon follows. If the symptoms become chronic, the general system suffers; disposition and intelligence become perverted, the appetite indifferent and digestion disturbed; apathy, debility, emaciation, after repeated attacks nervous exhaustion, and finally neurasthenia or paralytic symptoms terminate her miserable existence. Removal of the ovaries renders many such mares useful, and the results are not modified by the actual condition of these organs.

Nymphomania is more frequent in the cow than in the mare, being caused in the former by a pathological state of one or both ovaries, or the uterus, especially generalized tuberculosis. It manifests itself in mild cases by frequent and prolonged menstruations, but pregnancy is rare, and, if it exist, the animal soon aborts. She is fretful, irritable, with an insatiable propensity for the male, mounts other cows, paws the litter or ground like a bull, bellows, breaks loose from her stall as if temporarily enraged, disturbs her companions, interfering with their nutrition and milk secretion; in the field she wanders around listlessly, bellows, follows the bull and jumps fences. The external genitals are reddened, hyperæmic, tumefied, with a viscid, whitish or yellowish discharge from the vagina, and erection of the clitoris. In chronic cases the animal loses flesh, becomes anæmic and cachectic; her meat is lean, difficult of digestion, and of poor quality. After ovariotomy the temperament is changed and she becomes docile and seeks food and rest.

The *influence* of this operation upon the secretion of the *milk* has been the theme of many experiments. Most veterinarians who have inquired into this question have experienced that if it be performed at the time of weaning the calf, during maximum lactation, the milk secretion will continue without much

variation for fifteen to eighteen months and even to three years (?), while ordinarily the milk diminishes and ceases altogether in eight to ten months. The indications are less favorable in old cows or when performed a long time after calving; pregnant cows will usually abort. These opinions are corroborated by experiments made at the Arkansas Agricultural Experiment Station.

Besides the quantity, the quality of the milk is improved; the percentage of fat, sugar and caseine is increased by about one-fourth. During rutting, the mammary glands become congested, which may lead to pathological alterations; the milk coagulates readily and is sometimes unwholesome for children, by inducing abdominal pain, vomiting and diarrhœa.

Some veterinarians and dairymen have derived beneficial results from spaying, and have outspoken themselves against it. These opinions are altogether pessimistic, for, while in a few instances it was of doubtful value, in by far the majority of cases the evidence is in favor of increased lactation. Frequently the unfavorable consequences are explained by the conditions under which an operation is undertaken.

Perhaps its value was entirely too much overestimated and thus the results have not fulfilled anticipations. Probably on account of the large number of deaths, especially in the mare, in which before the advent of antiseptic surgery the mortality was high, the operation did not inspire the proprietor with confidence; over fifty per cent of the cases were fatal. The fear of such consequences was sufficient to intimidate even the most courageous surgeon and stockman.

Cadiot, during March of 1892, extirpated the ovaries of nine cows, six weeks to three months after calving. The daily average milk production of these cows, up to the present time, has been ten liters, while in twenty-five others, under the same conditions of lactation and feeding, the daily average was only eight and one-half liters. The daily average production of butter during the five months following the operation was in the former 416 g.; in the latter, only 337 g., a daily difference of 79 g. in favor of those spayed.

Ovariotomy *facilitates fattening*. While cows have their sexual attributes and desires, their appetite, especially during heat, is occasionally indifferent; they fall off in flesh. After spaying the food is digested regularly, they "put on flesh," the

body fills out, and fat is deposited between the muscles, so that they may be prepared for the slaughter-house, and yield meat which is nutritious, tender and of better quality than that of those not spayed, and at the same time give a considerable quantity of milk. This influence on the meat and fattening is not doubted and is thus applicable to cows in which the milk production is insufficient and which can be profitably sacrificed to the butcher.

It is especially indicated in old cows which are to be slaughtered, as the fœtus and its membranes entail a certain amount of nutriment at the expense of the body. The zoötechnist thus reaps a double profit: increase in quality and quantity (1) of the milk, and (2) of the meat.

In the mare, age, season and temperament are not considered. Procrastination is only to be countenanced by a previous general or infectious disease and inflammatory conditions of the intestines. The same is true of the cow in operating for nymphomania. If its purpose is to augment the flow of the milk in the cow, the time and the age must be considered, that is to say, from four to six weeks after calving and before rutting again. If there be signs of heat, the operation must be postponed. The animal should be full grown. In general, it should be done when the milking qualities of the animal are commencing to diminish.

The position of the ovaries being on each side of the median line, close to the inlet of the pelvis and the point of incision of the vagina, makes it feasible to reach these organs with two fingers in the peritoneal cavity. In the mare, on the contrary, the ovaries are more anterior in the sublumbar regions, so that they cannot be reached in this manner, and the strong, resisting ovarian ligaments prevent their being drawn into the vagina. On introducing the hand into the cow's vagina, its walls are flaccid, collapsed and its cavity small. But during the examination the walls dilate in every direction until they are in close contact with the rectum above and lateral walls of the pelvis. The vagina is then a roomy oval cavity, having its greatest dimension in region of the os uteri and freely admitting the movements of the hand.

Preparation of the Patient.—The preparation of the mare and the cow is about identical. They should be fed on half-ration for three or four days previously and not at all on the day of

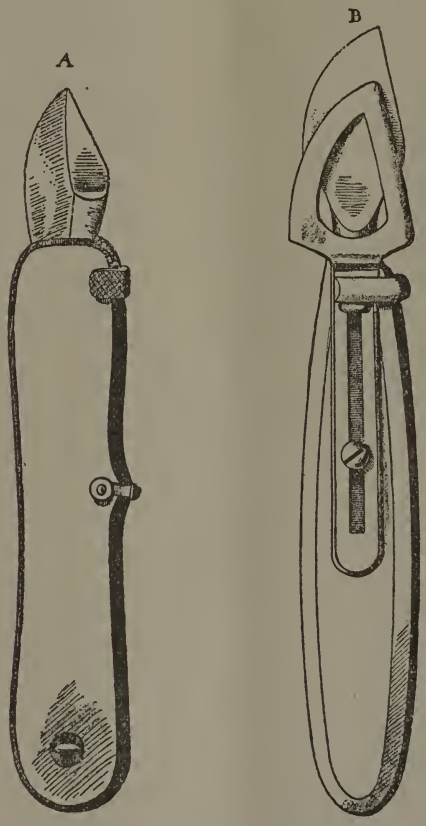
operation. The antiseptic treatment commences three or four days before by daily injecting the vagina with warm water and soap, followed by a three per cent carbolic acid or $\frac{5}{1000}$ per cent corrosive sublimate solution. Immediately before operating, the rectum and colon are emptied with warm clysters; if the bladder is distended, remove the urine with the catheter. In the cow this is best accomplished by passing the catheter along the superior wall of the vagina, or, still better, by placing the index finger of one hand on the post-urethral valve and guiding the catheter into the urethra.

Securing the patient.—The operation is performed with the animal in the standing position and properly secured. The stall suffices for cows; an assistant holding her by the nose, raises the head; two other assistants, standing on each side opposite to the flank, will prevent her moving from side to side and straining and arching her back with a strong bar across the loins. The mare should be secured firmly in a narrow stall or stocks, with hobbles on her hind feet and tied to a post on each side, or secured around her neck with a side-line, and a twitch on the upper lips. In rare instances I have found it necessary to cast her, although the operation is more laborious. Cadiot at first used anæsthetics (ether, chloral, morphia) in the mare, but has abandoned ether. In all operations of this nature, including castration of cryptorchids, I administer an ounce of chloral hydrate to induce a partial narcosis, especially if the patient be of a nervous temperament.

Modus Operandi.—Two methods of operating have been practiced. The older of these is that of opening the abdominal cavity by an incision into the superior part of the flank. The second consists in removing the ovaries through an incision into the superior wall of the vagina. Experience has shown advantages peculiar to both, but the *intra-vaginal* method is to be preferred to the *flank incision*. The ovaries are close to the seat of operation in the former, and its results have been more favorable. Two modes of procedure can here be followed: (1) Charlier's method, which requires a complicated set of instruments (vaginal dilator, concealed bistoury, curved scissors, torsion forceps, and thumbstall; (2) Colin's method, which is simpler and requires only three instruments, a bistouri caché (convex), torsion forceps, and clamp forceps. In the first method (Charlier's) the vaginal incision is made from

before to behind ; in the latter, from behind forwards. Ligation of the cervix uteri in addition to removal of the ovaries, finger-torsion, cauterization, complicated instruments invented for this purpose, etc., are now only of historical interest. The best torsion instrument is the linear ecraseur. It is simple, conveniently carried and obviates the necessity of having more

Fig. 1.



A. Bistoury with a sliding blade. *B*. Bistoury with a shield.

than two instruments possessed by every practical veterinarian, an ecraseur and a bistouri caché (Fig. 1), with blade convex, and sharp on both sides or on one side and at the point, 2½ to 3 cm. long and 1½ cm. wide, and preferably a metallic handle as being more antiseptic.

Delafond was the first one to suggest the use of Chassaignac's ecraseur. Charlier follows the example, but found it insufficient against preventing hæmorrhage, Busse, Zundel, Trasbot, Richard, Flocard, Delamotte, and others, on the contrary, have used this instrument with success. It should be well-made, long, with a strong chain. The instruments must be thoroughly clean and dipped into a 4–5 per cent carbolic solution or creoline.

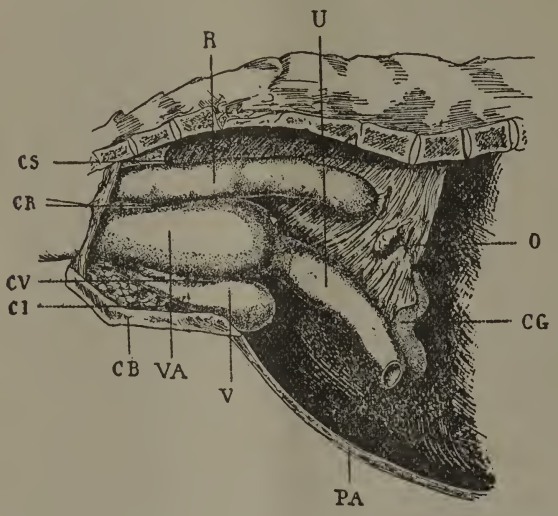
The animal being secured and the assistants properly instructed and stationed, the operator or his assistant thoroughly cleanses with a disinfecting solution and clean sponge the external genitals and their surroundings: the vulva, anus, base of tail, perinæum, croup, buttocks and thighs; finally the vagina is injected with an antiseptic solution and the mucous membrance swabbed out with a sponge, cotton or oakum tampon. These preliminaries, which must be done quickly, have a two-fold purpose: complete antisepsis and dilatation of the vaginal walls. No instrument to dilate the latter and fix the uterus is necessary; they are not only useless but cumbersome to the operator. No detail must be overlooked, in order to be successful; the finger nails must be short and clean; hands and arm washed with soap and covered with a strong antiseptic solution, and always rewashed after handling objects not antiseptic, or before undertaking a second operation. The operator is warned not to follow the practice of those who, during an operation, handle dirty objects, lay the hand on the croup, lubricate it with oil, and then reintroduce it into the vagina and the peritoneal cavity. The hand and arm should be and remain antiseptic.

Operation in the cow: First.—*Puncture of the vagina and enlargement of the opening.*

When the dilatation of the vagina is at its maximum, it is punctured. The hand holding the bistoury is passed forward into the vagina toward the neck of the uterus. Instead of a long incision, a simple puncture is made through the roof about two finger's breadth above the os uteri (Fig. 2), the blade of the bistoury being only partly pushed from its shield, held in full hand with the back of the hand on the floor of the vagina, and directed horizontally or slightly upwards at its point. The point remaining in the puncture, the blade is now entirely freed and, with a sudden but careful movement of the hand,

the incision is continued forward to the os uteri. This is not dangerous if done carefully. The blade is pushed back on its slide and the bistoury taken out and laid to one side. The hand being now introduced into the vagina, the index finger seeking the incision, is pushed through the latter. Here it may happen that the finger is arrested, if the peritoneum has not been cut through, when it may be ruptured with the end of the index finger. Here, however, great precaution is necessary that, if the peritoneum be resisting, it be not torn away from

FIG. 2.



Longitudinal section of abdominal and pelvic cavities of the cow to the right on the median line. *O* Ovary. *U* Uterus. *CG* Left corner of uterus. *VA* Vagina. *R* Rectum. *V* Bladder. *CR* Excavatio recto-Seminalis. *CV* Excavatio vesico-vaginalis. *CS* Excavatio superior. *CI* Excavatio inferior. *CB* Ischium. *PA* Abdominal wall.

its sub-serous attachments instead of rupturing, and that by any lateral deviation of the finger it is not unnecessarily lacerated. If this be unsuccessful, the bistoury is reintroduced, as before, the serous membrance incised, which must be ascertained with the finger without removing the bistoury from the vagina. We only meet this obstacle when the peritoneum is the seat of pathological changes.

The first perforation having been successful, the incision is now enlarged to admit easily two fingers. The index finger

and then the thumb are introduced and the two strongly separated from each other (longitudinally) on the median line, in order to tear the vaginal wall sufficiently to admit the index and middle fingers. In this way the wound can be enlarged so as to admit the whole hand if necessary.

Puncture of the vagina is the most delicate step in the whole operation; if this be successful the subsequent modus operandi is simple. Here, also, puncture of the aorta or one of its branch must be avoided, which would terminate in death from abdominal hæmorrhage in a few moments.

(To be continued.)

TUBERCULIN AS A DIAGNOSTIC AGENT IN BOVINE TUBERCULOSIS.

A. E. Conrow, V. M. D., M. D.

As is well known, R. Koch, some years ago, claimed to have discovered a substance now known as *tuberculin*, which possessed curative properties in tuberculosis.

Numerous experiments on the human subject, however, have shown it to be practically useless in the treatment of tuberculosis. It was noticed in the very first experiments made with tuberculin, that the hypodermic injection of this substance in individuals suffering from tuberculosis was followed in the majority of instances by a marked rise of temperature.

In several control experiments made on healthy human subjects this rise was not perceived,[1] therefore leading to the conclusion that the rise of temperature was an absolute indication of the presence of tubercular processes. More extended observations have, however, shown that in some *apparently* normal individuals a rise of temperature results, not unlike the rise seen in undoubted cases of tuberculosis.

These results force the question upon us—Whether after all this rise is not dependent upon slight tubercular processes

[1] Verhandlungen des X. Internationalen Med. Congress, p. 35. Berlin, August, 1890

which escape detection in a physical examination? Certain observations seem to strengthen this conjecture, and reference to these experiments will be made later on.

On the other hand, it was shown that in some cases of marked tubercular disease the injection of tuberculin did not produce the degree of increase of temperature considered to be absolutely indicative of tubercular lesions. These facts in connection with the danger of converting a tubercular lesion of old standing into an acute attack of milliary tuberculosis, has brought tuberculin into disfavor in the practice of human medicine.

In the practice of veterinary, as well as human medicine, tuberculin has not found practical application as a curative agent. As a diagnostic agent, however, it has given results which have, in many respects, revolutionized the methods of inspection of dairy cattle for tuberculosis. With this agent it is possible to detect tubercular lesions which defy detection by both auscultation and percussion. Gutmann, in 1891, at the Veterinary Institute of Dorpat, Russia, employed tuberculin on cattle and found it very satisfactory as a diagnostic agent.

Also in 1891, the Tuberculosis Commission of the Veterinary Department of the University of Pennsylvania made a number of experiments with tuberculin upon cattle, which were the first experiments on cattle made in this country. It was found that a reaction occurred in every case where tuberculosis existed in the animal, and did not take place in animals in which the disease did not exist.

In March, 1892, Dr. Leonard Pearson, of Philadelphia, made the first practical application of tuberculin as a diagnostic agent in the herd of Joseph E. Gillingham, at Villa Nova, Pa.[1]

Out of a total of 79 animals injected 30 reacted, all of which were found to be tuberculous upon post-mortem examination.

Again, in June and July 1892, Dr. Pearson injected the herd of cattle at the Pennsylvania Agricultural Experiment Station with tuberculin[2]. Of this herd but two cows gave the characteristic reaction; these were destroyed and both found upon post-mortem examination to be tuberculous. Another veterinarian made a physical examination of this heard and diagnosed two as being affected with tuberculosis, and two as being probably affected. One of these animals pronounced affected was

[1] Reported in the *Agricultural Science*, May, 1892.

[2] Published in Bulletin No. 21 Pennsylvania Experiment Station, October, 1892.

one of the two that had given the reaction with tuberculin. Upon making the post-mortem examination this animal was found to be tuberculous. The other three, however, were found to be healthy, thus showing conclusively the uncertainty of physical diagnosis.

My method of using tuberculin is very similar to that of Dr. Pearson. I first prepare a one-per-cent solution of carbolic acid in distilled water, and with this solution I prepare a ten-per-cent solution of tuberculin. Then I take the temperature of the animal to be tested, the best time for which is in the evening, as the normal temperature is usually higher at that time. After that is recorded upon the temperature sheet, I disinfect the skin of right scapular region with a three-per-cent solution of creolin. Then with sterilized hypodermic syringe I inject 0.2 to 0.35 c. c. of the ten-per-cent solution, regulating the amount by the size and condition of the animal. Temperature should now be taken every three hours for fifteen hours and compared with the one taken before injecting, so as to discover any reaction that may have taken place. An elevation of two degrees F., I am aware, is usually considered as indicative of tuberculosis. We deviated somewhat from this rule in our examination of the Charles S. Taylor herd, as will be seen later on. Before considering the Taylor herd, I will cite a few cases from my practice which show the efficiency of tuberculin as a diagnostic agent.

January 27, 1893, I saw an imported Guernsey cow, fourteen years old, suffering from bronchial cough. The respirations were accelerated and jerky; she had a dry staring coat, and auscultation revealed sibilant rales. The physical condition was one which is usually accepted as indicative of tuberculosis. Her temperature was taken at 9.45 p. m., and was found to be 100.6° F. Thereupon, I injected her at 10 p. m. with 0.35 c. c. of tuberculin. The temperature was taken at different intervals and found to be as given in the appended table:

9.45	11.45	2	4	6	8	10	12	1.15
Before injection	P. M.	A. M.	A. M	A. M.	A. M.	A. M.	M.	P. M.
100.6	101.2	101.0	101.2	101.0	101.8	102.0	101.0	101.0

As is shown by the table, the greatest rise observed was 1.4° F. I saw the same cow November 24. She was then more emaciated, and her physical symptoms more pronounced than when I injected her in January. Being now useless as a

dairy cow, I decided to destroy her, and the post-mortem examination revealed chronic lobular pneumonia, but no lesions of tuberculosis were found. This case proves the uncertainty of the physical method to which we have already referred.

February 24, 1893, I saw a Jersey cow, eleven years old, which showed some symptoms of tuberculosis, but owing to the difficulty of physical diagnosis, I decided to use tuberculin. Her temperature was taken at 8.10 p. m. and found to be 103.2° F. I then proceeded to inject her at 8.20 p. m. with 0.3 c. c. tuberculin. The following table indicates temperature variations :

8.20 P. M. Before injection.	10.20 P. M.	2.30 A. M.	5.50 A. M.	8 A. M.
103.2	104.2	103.8	105.8	106.2

As shown by the table there was a reaction of 3° F., so I destroyed her, and the post-mortem examination revealed extensive tuberculous lesions of anterior lobes of both lungs.

On the twentieth of March, 1893, I saw a Guernsey heifer two and one-half years old that had an abscess of the parotid gland, but in other respects was in good condition. I injected her at 10.45 p. m. with 0.33 c. c. of tuberculin. The temperature variations are given in the appended table :

10.30 P. M. Before injection.	1.15 A. M.	3.25 A. M.	5.40 A. M.	7.15 A. M.
102.2	101.8	101.2	104.	105.

As shown by this table the greatest rise observed was 2.8° F. I destroyed her, and post-mortem examination revealed tubercular lesions of both lungs, especially marked in the anterior lobes.

Charles S. Taylor, of Green Hill farm, near Burlington, N. J., having one of the finest herds of Jersey cattle in this section, and taking great pride in them, had them thoroughly examined every few months by a competent veterinarian. Occasionally one would be pronounced tuberculous and destroyed. However, not being entirely satisfied that these physical examinations were excluding tuberculosis, he concluded to have them tested with tuberculin.

Dr. E. B. Bunting, of Burlington, and myself were called for that purpose. We had observed that the injection of 0.2 to 0.3 c. c. of tuberculin into an animal badly affected with tuberculosis did not give as great a reaction as when the

same amount was injected into an animal with but slight lesions.

In view of the great value of this herd, and of the fact that Mr. Taylor agreed to a second examination to be made next spring, we decided to use 2.5° rise as indicating tuberculosis, and adhered to it in every instance, unless physical examination gave evidence of the existence of the disease.

We injected in all 114 head; sixty-one on the evening of November 7, and fifty-three on the evening of November 10, 1893.

The following tables give the temperature of each animal before injecting with tuberculin, and the temperature nine, twelve and fifteen hours after the injection; further, the amount of reaction in each case, the organs found affected with tuberculosis, extent of tuberculous processes, and the average temperature of cows and heifers.

COWS.

Cows.	Temperature Before Injection.	Nine Hours After.	Twelve Hours After.	Fifteen Hours After.	Amount of Reaction	Remarks.
1	101.4	101.6	101.4	101.4	0.2	Not destroyed.
2	100.6	102.8	103.	105.2	4.6	Lungs and visceral pleura affected.
3	100.5	102.8	103.2	105.2	4.7	Abscesses, both lungs affected.
4	101.2	102.2	105.	106.	4.8	Abscesses, lungs and mediastinal glands.
5	101.5	101.6	101.6	102.6	1.1	Not destroyed.
6	101.4	101.8	100.8	101.9	0.5	" "
7	102	105.3	104.4	105.	3.3	Abscesses, lungs and mediastinal glands.
8	101.2	106.	106.6	106.8	5.6	Mediastinal glands very slightly affected.
9	101.2	103.6	106.4	106.	5.2	Lungs and glands affected.
10	101.4	102.	103.6	103.4	2.2	Not destroyed.
11	101.2	104.2	104.8	104.2	3.6	Lungs and inguinal glands slightly affected.
12	101.4	105.4	106.6	105.9	5.2	Lungs and inguinal glands slightly affected.
13	102.6	105.6	103.8	104.4	3.0	Lungs and mediastinal glands slightly affected.
14	100.6	105.6	105.6	104.2	5.0	Lungs, mediastinal and mammary glands affected.
15	101.4	102.2	104.2	106.	4.6	Lungs and mediastinal glands affected.
16	102.2	105.4	105.	104.4	3.2	" " " " "
17	101.6	102.2	103.8	103.6	2.2	Mediastinal glands affected.
18	101.8	104.4	104.8	105.6	3.8	Both lungs badly affected.
19	100.8	106.	103.8	102.8	5.2	Mediastinal glands affected very slightly.
20	101.4	102.2	105.2	105.	3.8	Lungs and mediastinal glands affected badly.
21	101.	103.8	106.	105.6	5.0	Mammary and inguinal glands affected slightly.

COWS. (Continued.)

Cows.	Temperature Before Injection.	Nine Hours After.	Twelve Hours After.	Fifteen Hours After.	Amount of Reaction.	Remarks.
22	101.2	105.8	106.	104.4	4 8	Small abscess in lungs.
23	100.6	102.2	103.2	104.	3.4	Mediastinal glands affected slightly.
24	100.8	105.2	106.4	106.	5.6	Lungs and mediastinal glands affected slightly.
25	100.8	103.2	105.2	105.	4.4	Lungs and mediastinal glands affected slightly.
26	101.8	102.6	106.8	105.2	5.0	Lungs and mammary gland.
27	101.4	102.	102.6	104.2	2.8	Mediastinal and inguinal glands.
28	100.8	101.8	105.2	106.	5.2	Mediastinal gland and lungs slightly.
29	101.1	102.2	101.8	103.4	2.3	Not destroyed.
30	101.8	102.8	102.8	103.4	1.6	" "
31	101.4	102.6	100.8	103.6	1.2	" "
32	101.2	102.2	100.6	101.4	1.0	" "
33	100.6	100.2	100.9	102.4	1.8	" "
34	101.2	100.8	106.8	105.4	5.6	Mediastinal and inguinal glands slightly.
35	101.4	107.	106.8	106.2	5.6	Lungs and mediastinal " "
36	101.4	104.2	106.8	105.6	4.6	" " " " bad.
37	101.2	106.2	105 4	105.	5.0	Diffused abscesses, lungs.
38	101.	103.4	105.6	106.6	5.6	Mediastinal gland, abscesses, lungs.
39	101.2	101.8	104.2	105.2	4.0	" " " "
40	102.6	104.4	104.4	104.8	2.2	Both lungs very bad.
41	102.	103.4	104.	105.6	3.6	" " mediastinal glands.
42	101.4	104.8	103.6	105.8	4.4	Lungs, mammary gland, ovary.
43	102.	101.6	103.	105.4	3.4	Mediastinal and inguinal glands.
44	101.6	101.2	103.4	105.2	3.6	" " " "
45	102	101.2	102.2	102.3	0.3	Not destroyed.
46	101.8	103.	105.9	105.6	4.1	Lungs and mediastinal glands.
47	102.	102.	102.6	104.2	2.2	Not destroyed.
48	101.2	102.4	104.8	104.8	3.6	Lungs and mammary glands.
49	102.4	103.6	102.8	105.2	2.8	" " mediastinal "
50	101.6	102.2	105.2	105.2	3.6	" " " "
51	101.2	100.9	101.4	101.2	0.2	Not destroyed.
52	102.1	104.4	107.2	106.	5.1	Both lungs affected.
53	101.	101.2	101.4	101.6	0.6	Not destroyed.
54	101.4	102.4	105.2	107.2	5.8	Lungs and spleen slightly affected.
55	101.	100.8	102.4	104.6	3.6	Mediastinal and inguinal glands affected.
56	101.3	106.4	107.2	106.2	5.9	Mammary gland and ovary and pearl disease.
57	101.	101.4	101.4	104.4	3.4	Mammary and mediastinal glands affected.
58	101.8	106.4	107.4	106.	5.6	Lungs slightly affected.
59	101.	101.2	101.6	102.2	1.2	Abscesses in both lungs.
60	100.8	101.1	102.2	105.2	4.4	Mediastinal and inguinal glands affected.
61	101.6	101.8	105.2	106.4	4.8	Lungs affected.
62	101.	100.8	101.	103.2	2.2	Not destroyed.
	101.4	103.1	104.	104.6	3.5	Average temperature of 62 cows.
	101.35	103.6	104.7	105.2	4.32	" " 48 destroyed.
	101.4	101.65	101.6	102.35	1.17	" " 14 not destroyed.

BULLS.

Bulls.	Temperature Before Injection.	Nine Hours After.	Twelve Hours After.	Fifteen Hours After.	Amount of Reaction.	Remarks.
1	101.2	104.4	103.8	105.1	3.9	Both lungs (bad case).
2	102.4	101.4	102.2	105.2	2.8	" " " "
3	102.6	101.2	101.6	101.2	—	

HEIFERS.

Heifers	Temperature Before Injection.	Nine Hours After.	Twelve Hours After.	Fifteen Hours After.	Amount of Reaction.	Remarks
1	103.2	101.2	101.7	101.6		
2	101.6	100.9	101.	100.9		
3	101.6	101.2	101.4	101.8	.2	
4	102.7	103.2	105.2	105.2	2.5	Small abscess in lungs.
5	101.8	101.	104.2	105.6	3.8	Ovary and pearl disease of mesentery.
6	102.	101.	101.2	101.4		
7	101.8	100.8	101.6	101.2		
8	102.	100.8	101.2	101.		
9	102.2	101.	101.4	101.2		
10	101.8	101.2	101.4	101.1		
11	102.	101.4	101.4	101.4		
12	101.6	101.	101.2	101.2		
13	101.8	100.2	101.2	101.		
14	101.8	100.2	101.4	103.2	1 4	
15	101.6	101.2	101 9	101.4	.3	
16	102.1	100.2	101.4	101.6		
17	102.4	100.6	101.8	101.4		
18	101.8	100.2	100.8	100.2		
19	101.2	100.6	101.8	101.		
20	101.2	100.2	101.2	101.		
22	102.6	100.7	100.8	101.2		
23	102.4	102.4	102.2	102.6	.2	
24	102.4	101.6	101.6	102.6	.2	
25	102.6	102.6	101.9	102.6		
26	102.6	101.6	100.6	102.		
27	102.4	102.2	101.9	101.5		
28	102.4	102.4	101.2	101.		
29	101.6	102.	101.6	102.2	0.6	
30	102.6	102.	102.	102.6		
31	102.	101.8	102.2	102.2	0.2	
32	102.4	104.6	105.8	104.8	3.4	Pearl disease of mesentery.
33	101.4	101.	101.2	101.4		
34	102.	101.2	101.6	102.2	0.2	
35	102.4	101.4	101.6	101.4		
36	102.4	103.2	103.8	103.	1.4	
37	101.8	102.2	103.2	104.8	3.0	Condemned.
38	101.4	100.8	102.4	103.	1.6	
39	102.6	103.8	104.8	104.2	2.2	Condemned.

HEIFERS. (Continued.)

Heifers.	Temperature Before Injection.	Nine Hours After.	Twelve Hours After.	Fifteen Hours After.	Amount of Reaction.	Remarks.
40	102.2	101.6	100.8	101.		
41	102.2	102.	104.	105.2	3.0	Condemned.
42	102.	101.2	101.	100.6		
43	101.6	—	101.6	101.9	0.3	
44	102.2	101.6	102.4	102 8	0.6	
45	102.2	102.6	104.6	105.6	3.4	Condemned.
46	102.6	104.2	106.	105.6	3.0	Condemned.
47	102.2	101.	100.4	102.2		
48	102.	103.8	105.6	105.2	3.6	Condemned.
49	102.	105.8	104.4	105.4	3.2	Condemned.
	101.87	101.7	102.2	102.4		Average temperature of 49 heifers.
	102.2	103.3	104.8	105.2	3.3	" " 10 condemned.
	101.7	101.2	101.5	101.6		" " 39 not "

Moorestown, N. J.

EPIZOÖTIC ABORTION IN COWS.

By Simon J. J. Harger.

Every veterinarian, dairyman and farmer, although not familiar with the ætiology and pathology of epizoötic or infectious abortion, has at least been painfully impressed with its consequences. We all have seen only too often, in the most valuable herds, the ravages of the disease spreading from one animal to another until, perhaps, everyone has become a victim, and sometimes under conditions when it was least expected. This is a serious loss to the stockman, and the veterinarian is frequently appealed to for aid. My attention was some time ago called to a valuable herd of Jerseys and Guernseys in which this condition existed.

The contagious nature of epizoötic abortion was first identified by Bräuer, who discovered that the mucous secretion of cows which had suffered from abortion of an epizoötic nature, could induce the same result in healthy, pregnant cows. By introducing this mucous into the vaginæ of pregnant cows,

abortion would follow in from nine to twenty-one days. The vaginal secretion as well as the liquids in the fœtal envelopes contained micrococci. Franck also found, in the fœtal liquids, epithelial cells, micrococci and lymphoid cells containing the latter, to which was attributed the cause of the disease. Lenhert injected the contents of the vagina of cows eight days after abortion into the vaginæ of pregnant cows, causing abortion in from twelve to twenty days afterwards. Bräuer reached the same results with wads of cotton soaked with the vaginal contents and placed into the vaginæ of pregnant cows for ten minutes; abortion occurred in nine to fifteen days. Reindl mentions an instance of a bull, hired by the proprietor's neighbors, which infected the cows of a whole community. Inspection showed the existence of small petechial spots on the penis, similar to those seen in the vagina of aborting cows.

It would be interesting to know the mode of infection. Does it result only from direct contact, or can the specific agent be disseminated through the air? Does the virus reproduce itself within the body, outside of the body, or both? At present there is no evidence that the virus is volatile. Infection seems to result from direct contact (Franck). Roloff observed the disease among the cows in one stable without affecting those in an adjoining one nor some recently purchased. The infection seems to take place directly from animal to animal or through the litter, wet stable floors, urinary secretions, and attendants, the vagina acting as a fertile soil for the growth of the virus, whence it finds its way to the fœtus and uterine walls. If the abortion occur during the latter part of gestation, the longevity of the virus possibly may enable it to cause the accident during the next pregnancy.

Besides the presence of a specific organism—let us take this for granted—there are some predisposing causes for this disease. It occurs in stables which are sanitary and in those that are filthy; in large and in small herds, in spite of all hygienic precautions; also the disease has, without doubt, been seen more frequently in recent years. Perhaps we may here find conditions similar to those which exist in tuberculosis. It is easy to understand that, as in the latter disease, the unnatural conditions of existence, constant stabulation and especially consanguinity or inbreeding, so extensively practiced of late, may be

partly responsible and so change the natural resistance of the animal tissues that they become a productive medium for the pathogenic organism. It is observed that these conditions predispose both to sporadic and infectious abortion. (Schneidenmühl.) To these must be added the drain of the milk secretion upon the system. The stock bull should be changed at intervals, new blood introduced (refraischment), and too early pregnancy avoided.

The essential question is—How can the prevention and eradication of this disease be accomplished? The prophylactic measures to this end are numerous and varied. At one time it was thought among farmers that the offensive acrid secretion of the skin of the goat was a predisposing factor. Among the preventives may be mentioned a proper arrangement of the interior of the stable and the stalls; water fresh and not too cold; not too much light; good sanitary conditions and periodical disinfection; avoiding traumatisms in the stable, during work, or in pasture; good physical care; nutritious, digestible food, of good quality, but not excessive in quantity, nor too bulky, especially during the latter part of pregnancy; sudden changes of food; avoiding food containing specific poisonous products from fermentation; improper harvesting and vegetable parasites; removal of pregnant cows to a separate stable some time before calving. The refuse of sugar refineries and whisky distilleries should be withheld, or only given in small quantities mixed with other aliments; the same can be said of cotton-seed and rape-seed cakes. Violent exertion may, from the carbon dioxide accumulation, asphyxiate the fœtus, or, from a high temperature, excite uterine contractions. The mere sight of such a cow about may have the same effect on those alongside of her.

These preventive measures, however, are not in themselves sufficient to ward off a disease which is of an infectious nature, and more specific treatment is requisite. To this effect a routine of treatment, consisting of antiseptic applications to the vagina, the vulva and the surrounding regions, and periodical disinfection of the stable is advisable. In some instances this routine, together with rational breeding and management, is successful; but in many more it is not. A few years ago, Bräuer instituted a mode of treatment for epizoötic abortion which, more

than anything else, has induced me to write this article. He administered to cows subcutaneously, upon the flank, two to four months before calving, five to ten gms. (one and one-half to two and one-half drachms) of two per cent watery solution of carbolic acid, repeated every two weeks, with the most favorable results. In this manner he treated two stables in which, in spite of thorough disinfection, from two to four cows aborted every year. In every instance the subsequent calving was normal, with the exception of one in each stable, a control animal, which was not treated.

Regenbogen witnessed in one stable twenty-six abortions out of a herd of fifty-six, from the summer of 1887 to February 10, 1888. He then injected the carbolic acid solution into the flank of twenty-six of the number, pregnant from five to seven months, repeated every fourteen days. The success was complete, with the exception of one, to which the injection was not given. Hanbold, during an epizoötic of the disease in Saxony, used this treatment with, he claims, negative results. The results of Schleg were indifferent. In the hands of Ulig and Röberts it was quite successful. The former gave the solution in ten-gram doses to a herd one to three months before calving, in which twenty-three cows had aborted the year before; the placenta here was removed and destroyed. No abortions occurred afterwards. Augerstein also conducted a series of experiments.

In the spring of 1890, epizoötic abortion appeared in the stable of S. S. Of fifteen cows, eleven aborted, as usual, one after the other in close succession. The treatment in these cases consisted of a three-per-cent watery solution of creolin injected into the vagina three times daily; the buttocks, thighs, legs and tail were thoroughly cleansed every day with the same solution. The disease could not be arrested and, finally, the remaining four cows were also affected.

At about the middle of the next gestation the disease reappeared in this same herd; three cows, five to seven months pregnant, aborted successively. Each one of the remaining cows now received a subcutaneous injection of twenty gms. of a two-per-cent watery solution of carbolic acid. This treatment was repeated every two weeks, the whole extending over a period of ten weeks. The places selected for the injection were the right and left shoulder alternately. All afterwards gave birth to a healthy calf at full term. Subsequent to this

the manure was removed, the stable floor thoroughly scraped and disinfected, and the walls whitewashed; since then none of the animals have been affected.

In a second stable of imported cows, eight, six to seven months pregnant, aborted at short intervals in May, 1891. Of the remaining, all those pregnant five months and over, were treated with the carbolic acid solution, and in none did birth occur prematurely.

In a third instance, three cows, two six, and one seven months pregnant, aborted in the fall of 1891, while running in pasture. The remainder of the herd received the carbolic injection only twice without a recurrence of the disease.

Finally, in a fourth herd, while pasturing during the summer of 1891, nine cows and heifers, five to eight months pregnant, "slung" their calves during a period of four weeks. Those which had not aborted, consisting of seventy-four cows and nine heifers, were treated in the manner described above for ten weeks. In the course of the following four weeks, two cows and two heifers gave premature birth, but after the fourth injection all remained healthy. The last instance, in view of the large number of animals, is perhaps the most decisive in support of this mode of treatment. In all cases the carbolic injection had no influence upon the quantity or the quality of the milk. My colleague, Dr. Pearson, has applied this treatment in a herd of six Jerseys in good flesh and apparently in good health and with good sanitary surroundings. All but one cow had aborted in the latter months of pregnancy during the last two years. The external genitals, thigh and base of tail, were washed with a three-per-cent creolin solution every other day, the stable properly disinfected and the stable floor excavated. About the first of July all of the cows after the sixth month of pregnancy, three in number, received one and one-half drams of a two-per-cent solution of carbolic acid every week until within several weeks before calving. Since then none aborted and all had healthy calves.

About the middle of July I was called to see a herd of twelve Jersey and Guernsey cows bred on the farm. The sanitary condition of the stable was the very best, as were also its surroundings, as well as the pasture. Since March, four of the cows had aborted at intervals of about a month. Five cows were pregnant over five months. The posterior quarters and

vulva were washed off three times weekly with a two per cent solution of lysol. Each one received subcutaneously over the shoulder two drams of a two-per-cent carbolic acid solution every two weeks, repeated five times. Up to the present time no abortions have occurred and parturition has been normal.

From the accounts of such investigations and the résumé of their results given here, there is no doubt that subcutaneous injections of carbolic acid develop in cattle a certain degree of immunity against epizoötic abortion. Perhaps it may have the same value in infectious abortion sometimes seen in mares and ewes. The more the animals are pampered and bred in-and-in, the less effectual it is ; the more natural the conditions of existence and the more robust the constitution, the more effective it is. (Schneidenmühl.) However, this procedure should be supplemented by the treatment of the animal itself, the proper disposition of the fœtus and its membranes, the disinfection of the cow stable, etc., in order to suppress the disease permanently. As cows which have once aborted are prone to do so again, and reinfect the stable, it is a question how to dispose of them. Experience teaches that in order to reach the desired result it is best to send them to the butcher. If, on account of their value, this is too great a sacrifice, they should at least be isolated from the rest in a separate stable until such time as will prove that they are absolutely healthy and parturition is normal. Lysol, creolin three to five per cent, corrosive sublimate $\frac{1}{1000}$; carbolic acid, $\frac{5}{1000}$, and chloride of lime are the best disinfecting agents for stable and drainage pipes. A stable floor consisting of earth, which readily absorbs the excretions, should be dug out for four or five inches and refilled. By following the above conditions it is possible to eradicate the disease completely from a stable and prevent its spreading over a whole district.

The question naturally arises—How does carbolic acid modify or destroy the activity of the exciting cause of epizoötic abortion? What is its *modus operandi* in preventing the disease? The questions can be better answered after the nature of the disease is better understood, and the identity of the "virus," which is as yet unknown, but which is undoubtedly microbic or of microbic origin, is determined. Its effects are, perhaps, due to its well-known germicidal properties; but even then, considering the smallness of the dose and the long

intervals between the injections, it would be a remarkable example of the subtleness of therapeutic action. Whether or not the above statements teach us what they appear to do on the surface, experience will tell, and the writer would like to learn of any failure or success attending the application of this treatment by the practitioner. If the results are always as gratifying as we are led to believe from these observations that they are, this treatment is a welcome addition to veterinary science.

THE RESULTS OF INOCULATIONS OF MILCH COWS WITH CULTURES OF THE BACILLUS DIPHTHERIÆ.[1] *

By A. C. Abbott, M. D.

From the Laboratory of Hygiene, University of Pennsylvania.

During the past twelve or fourteen years there have appeared at odd intervals several epidemics of diphtheria that are believed to have originated with the milk used by the persons affected. This circumstance has led to their being known as "milk epidemics" of diphtheria, and by some individuals the milk is believed to have been capable of producing the disease at the time it was obtained from the cow, and not, as is more generally the opinion, that it had become infected on its way from the cow to the consumers. In at least three outbreaks in England, there was no evidence that the milk had been infected by those through whose hands it had passed, and, in consequence, suspicion was directed to the cows from which it had been obtained. With the idea of determining in how far this suspicion rested upon a possible basis, Klein,[2] endeavored to study the reaction of milch cows to the virus of human diphtheria.

[1] Read before the Association of American Physicians, Washington, D. C., May 31, 1893.

[2] Klein, "The Etiology of Diphtheria," Nineteenth Annual Report of the Local Government Board, Supplemental Report of the Medical Officer, 1889–90.

* Journal of *Pathology and Bacteriology*, October, 1893.

With this in view, he inoculated subcutaneously each of two healthy cows over the left shoulder with one cubic centimetre of a bouillon culture of the *bacillus diphtheriæ*. On the second and third days after inoculation, the temperature in each rose 1° C., and there was a diminution in the amount of food consumed, but by the fourth day both cows were again in an apparently normal condition.

On the second day following the inoculation there appeared beneath the skin, at the seat of operation, a localized, soft, painful swelling, which continued, and by about the eighth or tenth day was as large as one's fist. During the second week the tumor gradually diminished in size, became harder and more circumscribed, and could be readily moved about over the underlying tissues. During this time (the second week), both cows became affected with a cough, and percussion and auscultation revealed the presence of decided thickening and bronchial respirations in the upper portions of both lungs.

On the twelfth day, Cow No. 1 ceased taking food, and died on the night of the fourteenth day. On the twenty-third day, Cow No. 2 showed evidence of approaching her end; she was killed on the twenty-fifth day.

After the third day from the date of inoculation neither animal had a rise of temperature. Between the sixth and tenth day in Cow No. 1, and the fifth and the eleventh day after inoculation in Cow No. 2, there appeared upon the udder and teats a most peculiar eruption, appearing at first as injected papules, which on the following day became surrounded by a small vesicle, which in time was limited by a zone of reddened skin. The skin beneath the vesicle was indurated. The vesicles contained clear lymph. In ten days after their first appearance the vesicular eruption had become pustular; in another day the pustules were covered with a brown scab. During the two or three days following the scab enlarged and became brown-black in color. If at this time a scab was removed a bloody indurated ulcer remained. Two or three days later the scabs dropped away spontaneously, leaving a dry and healed scar; the entire process usually took from five to seven days. The smallest of these points of eruption were about 0·5 cm. in diameter, the largest from 1·0 to 1·25 cm. in diameter. They were always round or roundish in outline, and some of them, in the vesicular and pustular stages, exhibited a dark centre. None of

them were umbilicated. At the autopsies upon these cows essentially similar conditions were found in both.

In the neighborhood of the left shoulder, at the seat of inoculation, intimately attached to the skin, was found a dense mass, which, with the subcutaneous and muscular tissues, formed a peculiar circumscribed tumor, freely movable over the underlying structures, and surrounded by an œdematous and hæmorrhagic zone. Upon transverse section it was seen to consist of numerous thin and thick lamellæ of necrotic tissue, between which transverse sections of muscle fibres could be seen. In the neighborhood of this tumor was a swollen, œdematous lymph-gland, which in its periphery was somewhat hæmorrhagic. Adjacent to this gland were numerous smaller glands of a dark-red color. Upon microscopic examination both the peripheral and central portion of these glands contained much extravasated blood.

Both lungs in the upper portion, and also the middle lobe of the right and the lower lobe of the left were markedly hyperæmic. Groups of lobules were found that were of a deep red color, injected, œdematous, and that sank in water. The septa between the lobules were œdematous. The subpleural lymph canals were seen to be filled with clear (Cow No. 1) and with blood stained (Cow No. 2) lymph. Upon section through the upper lobes the bronchi were everywhere seen to be surrounded by a dense gray exudate, which faded off into the surrounding tissues. The bronchial glands were swollen and œdematous.

On the surface of the liver were numerous irregular, gray, or brownish spots, which proved to be necrotic areas of liver tissue. Both kidneys were hyperæmic, with also gray areas of fatty degeneration in the cortical substance. The visceral pericardium contained areas of extravasated blood, both punctiform and conglomerate.

The microscopic examination of horizontal sections of the tumor from the seat of inoculation showed a process characterized by white necrotic septa, which formed a picture similar in all essential respects to that seen in sections of membrane from human diphtheria. The muscle bundles between the septa were at many points in advanced necrosis. Everywhere in the septa and necrotic tissues appeared masses of diphtheria bacilli, either singly in small or, as in the tumor from Cow No. 2, in large ball-like masses.

Muscle fibres near the necrotic tissues were here and there, either in part or entirely, supplanted by masses of bacilli. In many points the gradual penetration of the dying muscle substance by the bacteria could be readily made out.

From the tissues of the tumors from both cows cultures were made. In not one of the twenty-four smear tubes was anything obtained but a pure culture of a bacillus which in morphological and cultural peculiarities could not be differentiated from the *B. diphtheriæ* obtained from man or from guinea-pigs. Cultures from the lungs, kidneys, and heart's blood were negative. From the lymph of the vesicles on the udder, it was possible to demonstrate the *B. diphtheriæ*, not only in cover-glass preparations, but also by culture methods.

Bacteriological examination of the milk made on the fifth day after inoculation, the date at which the eruption first appeared upon the udder, resulted in the appearance of colonies of the *B. diphtheriæ* on three out of four slanted gelatin tubes, upon the surface of each of which one-sixteenth c.c. of the milk from Cow No. 2 had been deposited. On three subsequent occasions, the tenth, eleventh and twenty-fifth days after inoculation, the milk was again examined, but no colonies of the *B. diphtheriæ* could be found.

In order to demonstrate the contagious nature of the eruption on the udders of these cows, two calves were inoculated with the contents of the vesicles and pustules. The inoculations were made in the way commonly practiced in vaccinating calves, viz., into a small pocket in the skin of the abdomen.

Between the sixth and the seventeenth days both calves developed an eruption in all essential respects identical with that upon the cows from which they had been inoculated. Calf No. 2 developed a cough, and Calf No. 1 a mucous discharge from the nostrils. On the twenty-fourth day both calves were killed. No evidence of the eruption could, at this time, be found. The upper lobes of both lungs of both calves and the upper part of the adjacent lobes were dark red in color, solid, and sank in water. Upon section the bronchi were surrounded by a dense gray tissue. The medullary substance of both kidneys was hyperæmic, while the cortical substance was grayish-white and conspicuously fatty.

This is, in short, the description given by Klein of the result of his inoculations of milch with cultures of the *B. diphtheriæ*.

The particular object of Klein's experiments was apparently less to study the pathological lesions produced in these animals by the inoculations than to determine if, through the inoculation of cows with the virus of human diphtheria, it was possible to demonstrate its presence in their milk. The experiments were suggested to him by an opinion then extant in England, that in several of the milk epidemics of diphtheria (particularly those in the north of London in 1878, in Yorktown and Camberley in 1886, and in Enfield and Barking in 1888) the infective agent had reached the milk through the cow, and had not been introduced into the milk through human agency—an opinion of sufficient gravity to call for all light that experiment is capable of throwing upon it. This opinion may have been influenced by the erroneous impression that the pseudo-membranous inflammation of the throat with which cattle, especially calves, are at times affected, is identical with diphtheria in the human being.

In an address given by Löffler, at the International Medical Congress in Berlin, 1890, in the Section on Hygiene, he expressed the opinion that the results of these experiments were of a doubtful nature, and that the subject was of such importance as to require confirmation from other sources. It was through this address that my attention was called to the experiments of Klein, and as opportunity has presented during the past winter to repeat these inoculations, I have done so. It is the results of these experiments that I propose to embody in this paper.

EXPERIMENTS.

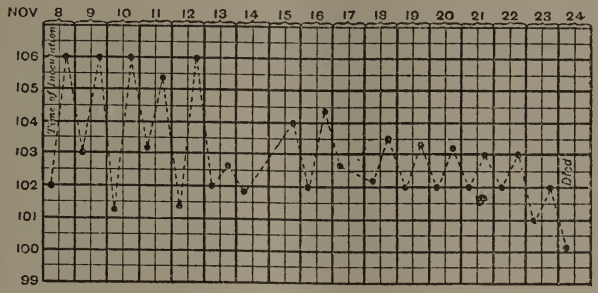
Cow No. 1. Inoculated March 8, 1892; died March 24, 1892.—On March 8, 1892, I inoculated into the tissues of the right shoulder of this cow 1 c.c. of a bouillon culture of *B. diphtheriæ*, the virulence of which was at the same time tested upon a guinea-pig, the latter dying after the usual time, and with the tissue changes common to these animals when under the influence of the virulent *B. diphtheriæ*. This cow had for some time prior to inoculation been tuberculous, and at the date of inoculation was markedly so.

Before inoculation careful examination was made of her udder and teats, and they were found to be normal, no excoriations, blebs, ulcers, or anything else of an unusual character being present.

At this time her temperature was 102° F., and she had been having a tolerably regular evening exacerbation of about a degree higher. The daily range of temperature after inoculation will be seen by reference to temperature chart No. I.

At no time while under observation did this cow show any marked constitutional disturbances, beyond a rise of temperature, that might have been looked upon as a

result of the inoculation. She was never "off her feed," and, beyond a cough, showed no signs of discomfort. Her udder and teats were frequently examined, but at no time did we discover anything in the form of an eruption.



Temperature Chart No. I. Cow No. 1. Inoculated with culture of *B. diphtheriæ*, Nov. 8; died Nov. 24, 1892.

For three or four days after inoculation there was tenderness over the point at which the needle had been introduced; this was accompanied by a slight swelling, which rapidly diminished in size until ultimately it gave to the hand the sensation of a dense, flat nodule of about 3 x 5 cm. It was firmly attached to the skin and underlying tissues, so that it could not be easily moved about. Besides these points no noticeable alteration in the condition of the animal could be made out. She died November 24, sixteen days after she had been inoculated.

At the *autopsy* the tuberculous process was found to be very widespread. The lungs were little more than caseous masses and conglomerate tubercles. The bronchial glands presented a condition of caseation. The pleuræ were studded with tuberculous masses, likewise the peritoneum. The tuberculous process in the pleuræ and lungs was so advanced that no attempt was made to study the changes in these organs described by Klein, as resulting from his inoculations of cows with the *B. diphtheriæ*. The udder was carefully examined externally for evidences of pre-existing eruption, and internally by means of parallel incisions made at a distance of three-quarters of an inch from one another throughout the entire gland, but no abnormal condition was detected.

At the seat of inoculation was found a flat, tough mass, more or less adherent to both skin and underlying tissues, though with a little effort it was easily separated from both. This mass measured approximately 2 x 3 x 0·5 cm. This oval bit of tissue was unusually dense, and it was only with much difficulty that the point of a scalpel could be introduced into it. It presented nothing characteristic to the naked eye. It was simply a white fibrous-looking mass.

Under proper precautions an incision was made into the tumor with a knife that had been sterilized in the flame and allowed to cool. From the faces of the incision scrapings were made, and with these scrapings blood serum tubes were inoculated; Petri plates of glycerine-agar were made, and slant tubes of glycerine-agar were also inoculated. By none of these methods could we demonstrate the presence of living diphtheria bacilli in the tumor.

The tumor was preserved in absolute alcohol, and when properly dehydrated a portion was embedded in celloidin, while from another portion sections were cut without embedding. Examination of these sections revealed a most interesting condition.

Upon *microscopic examination* the tumor was seen to consist of two portions, a peripheral zone of new-formed connective tissue, and an irregular central area in an advanced condition of necrosis. In this central area, which formed the bulk of the tumor, could be seen muscle fibres and connective tissue in various stages of death. At many points the destructive process had advanced to such an extent that, beyond a reticulum of fibrin, with here and there fragments of cell nuclei, but little of the original structure could be made out.

The epidermis, where preserved, was quite normal. Just beneath it was a layer consisting of connective tissue and muscle containing an excess of nuclei. The fibres and bundles of connective tissue were pressed apart, evidently the result of œdema. Beneath the layer of muscle was a thicker band of connective tissue, which also presented an excess of nuclei. The nuclei in the layers just beneath the epidermis were of two kinds, polyform leucocytes and connective tissue nuclei. The leucocytes were sometimes aggregated into masses, which lay in and between the tissue elements. The lymph spaces of the tissues were dilated, and contained numerous leucocytes. The small veins were sometimes almost plugged with them, yet many still contained a few red blood corpuscles. Where the leucocytes were present in greatest numbers, the tissue elements about them did not stain. The increase in number of connective tissue nuclei was particularly well marked in the intermuscular septa and in the subcutaneous tissues; they were round, elongated, or slightly irregular, and some were fragmented. There were, moreover, polynuclear leucocytes in these septa.

The muscle fibres themselves in these situations were swollen, and presented a hyaline aspect; striations could not be found in them, and in a few instances an appearance was obtained that suggested the entrance of leucocytes into these hyaline fibres. The sarcolemma nuclei were also increased, sometimes several-fold. At one point in the muscle there was an exaggeration of nuclei, presenting the appearance of an abscess. Here the muscle fibres were most disintegrated, and many cells of the connective tissue type were discernible. Adjacent to this the tissues contained very few normally staining nuclei, and the tissues were quite without stain, and presented a finely granular or reticulated appearance, suggestive of fibrin. Such nuclear stain as was obtained here was seen in fragments of nuclei and these presented the greatest variety of form, being small, point-like, drawn out, and usually distorted, but agreeing in the common property of staining intensely with fuchsine. This is the area of most profound activity of the irritant. The fragmented nuclei in this situation came from two sources, the fixed cells and the emigrated cells or leucocytes. Just at the edge of the tumor, where the necrotic tissue passed into the more nearly normal tissue, the participation of the fixed cells in the process of nuclear fragmentation was more readily seen. As the deeper parts of the tissue were reached, the extensive nuclear fragmentation grew less and less, but here and there were small and larger areas of cells with round nuclei. These were sometimes only three or four in number, while at other points again they were more numerous. They were the fixed cells. Leucocytes were not

always found in these areas; they were often absent from the smaller, but were usually present in the larger areas. The small round cells, as stated, were regarded as derived from the fixed cells; and while they were most frequently not associated with cells which had fragmented nuclei, yet occasionally the reverse was the case.

The lymphatics in this locality contained an increased number of leucocytes. Moreover, the endothelial cells lining their walls were sometimes necrotic, and contained fragmented nuclei. In a section of a lymphatic, for example, in which several elongated endothelial cells were seen, perhaps one-half showed a distinct fragmentation of their nuclei. The smaller veins, also, as before mentioned, were often almost full of leucocytes, and in these too, at times, the endothelial cells of the intima had suffered this form of cell necrosis.

The further removed the tissues were from the point of most intense action of the irritant, the less alteration was there in their structure; but even in the most peripheral portion of the tumor mass there was cell death, as indicated by the fragments of nuclei in the tissues. A single nuclear figure was found in the fixed cells about the middle of the specimen, in a place where there was apparently active proliferation of the fixed cells.

The specimen stained by Weigert's fibrin method showed a focus containing many leucocytes and clumps of diphtheria bacilli. This corresponds with the abscess-like area above described.

The conspicuous alteration in the tissues generally at this point was the changes in the nuclei of the fixed and wandering cells, a nuclear fragmentation in all respects identical with that described by Oertel[1] in the tissues of the human subject dead of diphtheria, and by Welch and Flexner[2] in the tissues of animals that have succumbed to the experimental form of the disease. Under a low magnifying power this condition is seen as islands of irregular granules that stain intensely with the ordinary nuclear dyes, and lie scattered through a tissue that either does not stain at all or very imperfectly. In addition to these granular areas, that could readily be seen to consist of nuclear detritus, were other irregular masses that stained also with the basic aniline dyes, but which were much less coarsely granular than the groups of nuclear fragments. Under a higher magnifying power these latter resolved themselves into masses of bacilli, in all morphological and staining respects identical with the *B. diphtheriæ*, except that in most instances the irregularity of outline and staining peculiarity were more marked than usual.

In certain sections these groups of bacilli appeared as irregular rosette-like patches of varying size, while again in sections made from a different portion of the tumor, or running in another direction, they appeared as irregular, broken, granular lines. The tissue about them was in all cases nearly completely destroyed so that it was impossible to make out definitely the relation of the organisms to the surrounding tissue; but as a result of examination of a number of sections, it is probable that they had developed in, and filled, lymphatic spaces. In the irregular, roundish, or rosette-like patches of bacilli the staining was sometimes less intense at the centre than at the margin of the clump, while in the long,

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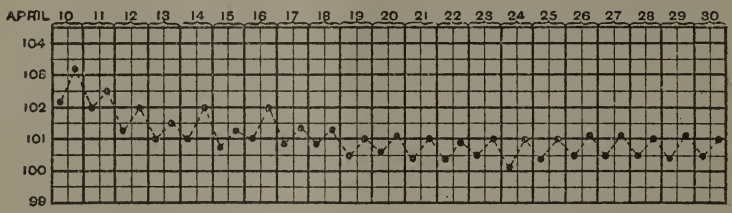
[1] Oertel, "Die Pathogenese der epidemischen Diphtherie, nach ihrer histologischen Begrundung." Leipzig, 1887.

[2] Welch and Flexner, "The Histological Changes in Experimental Diphtheria." *Johns Hopkins Hospital Bulletin*, August 1891, No. 15.

irregular, linear masses the color was more homogeneous. None of these masses of bacilli could be detected in the peripheral zone.

Cow No. 2. Inoculated April 10, 1893; killed May 1, 1893.—On April 10, 1893, at 10.30 a. m., Cow No. 2 was inoculated. She was thin but otherwise healthy; was suckling a calf at the time of inoculation. Prior to inoculation her temperature range had been from 100° to 103° F.; there was no eruption upon the udder, nor was there anything to indicate a condition other than normal. She was inoculated into the soft tissues of the right shoulder with 1 c.c. of a bouillon culture of *B. diphtheriæ*, the virulence of which was at the same time tested upon a guinea-pig. The guinea-pig died in about sixty hours after having been inoculated with 0·5 c.c. of the same bouillon culture; the autopsy revealed the conditions commonly seen under these circumstances. The culture employed was about forty-two hours old, and was but a few generations removed from a case of genuine, primary diphtheria.

At the time of inoculation the temperature of the cow was 102°.1 Fr.; on the evening of that day it went up 1°.1 Fr., and fell a degree on the following morning. This was the highest rise of temperature after inoculation, as can be seen by the accompanying chart. She evinced no constitutional effects of the treatment,



Temperature Chart No. II. Cow No. 2. Inoculated with culture of *B. diphtheriæ*, April 10; killed May 1, 1893.

other than that she showed signs of weakness after the fifth day; and though careful watch was kept for an eruption upon the udder similar to that described by Klein, nothing of the kind appeared. For a few days after inoculation there was some swelling and considerable tenderness about the seat of operation, but after about seven or eight days the tenderness had apparently disappeared, and the swelling was gradually diminishing in size. This continued until the twentieth day after inoculation, when she was killed. At time of *autopsy* the following conditions were observed:

At the seat of inoculation there was a small subcutaneous nodule firmly adherent to the overlying skin, and freely movable over the underlying tissues. Viewed from the external surface this nodule was about 3 cm. in diameter, but when dissected out was not over 1 x 2 x 2·5 cm. in volume. It was *very* hard; upon section it was laminated, and tolerably sharply circumscribed; it did not fade away into the surrounding tissues. At one side of it the neighboring tissues were marked by minute hæmorrhages.

The axillary and cervical lymphatics were not enlarged, nor were any of the other subcutaneous lymphatic glands. The lungs were normal, containing neither

hardened areas, nor any spots indicative of either a recent or a remote diseased condition. The parietal pleural was smooth and normal. The pericardium contained about 50 c.c. of clear fluid; both the pericardium and the endocardium were free from hæmorrhagic points; no fluid in either the pleural or peritoneal cavities. On the lower surface of the left lobe of the liver, which was otherwise apparently normal, were grouped together three irregular yellowish spots, which extended a short distance into the substance of the organ. The smallest of these spots was about 1 cm. in diameter, and the other two were about 1 x 2·5 cm. in area. Beyond a few scattered irregular whitish points there were no other markings upon the liver.

The adrenal bodies were apparently normal. On the surface of the left kidney there was at one point a small whitish area, evidently due to fatty change, besides two or three minute cysts; the kidneys were otherwise normal. The spleen was normal. The other viscera showed no change. There was no change either upon the surface of the udder or in its substance, as was seen by parallel sections through the organ made at about one inch apart.

From the centre of the tumor mass, at the seat of inoculation, five blood-serum slants were inoculated; after incubation for ninety-six hours at 37° C., they all remained sterile.

Microscopic examination of the seat of inoculation revealed a condition that inoculation of cows with *B. diphtheriæ* was in general identical with that described in the same locality in Cow No. 1, but differed from it in certain details. The process, while everywhere conspicuous for cell death, as evidenced by fragmentation of the nuclei, was, nevertheless, not so far advanced as in Cow No. 1. In many of the lymphatic spaces between the tissue bundles, masses of leucocytes, some of which had undergone complete necrosis, while others were less affected, could be made out. Throughout many of these masses of leucocytes, bacilli were scattered about in an irregular way, and in some instances small clumps of from four to six bacilli could be seen, having the appearance of being located within the bodies of leucocytes. In none of the sections could the tangled clumps of long, irregular bacilli, similar to those seen in Cow No. 1, be detected, but where the organisms were found they were always scattered about irregularly, as described above. Where muscle fibres were present they were in an advanced condition of hyaline degeneration, and were frequently to be seen penetrated by leucocytes. Though bacilli, in all morphological and staining respects identical with the *B. diphtheriæ*, were present in large numbers, it was nevertheless impossible to obtain cultures of them from scrapings from the centre of the tumor. As stated, five blood serum tubes were inoculated, but in none of them did the organisms develop. The yellowish points that were found by macroscopic examination of the lower surface of the left lobe of the liver were found microscopically to extend some distance into the substance of the organ, and to represent areas of fatty metamorphosis.

[To be continued.]

A CASE OF VOMITION IN THE HORSE, WITH RECOVERY.

By Albert Fricke Schreiber, V. M. D.,
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In March of this year, about 1 o'clock one morning, I was called to see a bay gelding, 9 years old, 16 hands high, 1200 lbs. in weight, showing the following symptoms: great depression, pinched appearance of face, indicating great suffering, high temperature, injected mucous membranes, and increased pulse and respiration.

The animal was continually lying down and getting up. In addition to these symptoms there was copious vomiting of food, consisting of hay and grain (corn-meal, bran and oats), the major portion of which was ejected through the nostrils.

A drench, consisting of ½ oz. ext. cannab. indica fld., 5 dr. aloes barb. in 1 pt. of warm water, was administered, which was, however, shortly afterward expelled during a fresh attack of vomiting. Morph. sulph. (grs. x) was then hypodermically administered, which gave some relief without, however, appreciably affecting the vomiting. The animal was then placed in a box-stall, and when I saw him again at 6 p. m., he was much improved, vomiting had ceased, and the mucous membranes had returned to almost normal appearance. He was still somewhat dejected, but appetite had partially returned.

In three days the animal was normal and doing his regular amount of work as a cart-horse.

In May, and also in October, the animal was again affected in a similar manner, and, as in the preceding instances, recovered in the course of three or four days. At present, the animal is absolutely normal. I could not attribute the cause of these attacks to anything but the large amount of food given, which consisted of one peck of equal portions of corn-meal, oats, and bran, given three times daily, with as much hay as the animal chose to eat.

I selected this case from my note-book, as it illustrates many interesting facts in connection with vomition in the horse, which, unfortunately, are often overlooked by the veterinarian.

It is generally taught, and is the prevalent idea among the large majority of veterinarians, that vomition occurring in the horse is indicative of rupture in the stomach.

Vomition, as it occurs in all other animals with which the veterinarian has to do, is not possible in the soliped.

In the first place, the stomach is of comparatively small size, the two sphincters are in close proximity, the cardia is in constant tonic contraction, while the mucous membrane is arranged around its orifice in folds.

Further, the oblique position of the œsophagus at its cardiac orifice, its small calibre, and the distance of the stomach from the abdominal walls, all tend, in connection with the aforementioned circumstances, to make physiological vomiting in the horse an impossibility.

In my experience, and as the veterinary records show, true vomition, unless connected with rupture of the stomach, is a rare occurrence. Cases are sometimes seen in which ejection of food through the mouth and nostrils is not connected with gastric abnormality of any kind. I refer to the ejection of food as a result of accumulation of food, in dilatation of the œsophagus, or jabot. It is usually not a difficult matter, to differentiate by ordinary physical methods, between the vomition of jabot and true vomition.

However, the vomiting of jabot simulates in many respects true vomition. In such instances, the history and general condition of the animal may serve to make a definite diagnosis possible. In the absence of a clear history, and where great depression supervenes, we must have recourse to other methods. One of the most simple methods, to prove whether the ejected mass be from the stomach, is to determine its reaction, either by means of litmus paper, or one of the other tests. If for any reason these means should prove unsatisfactory, the ejected mass may be rapidly examined for free hydrochloric acid and peptones.

These, in connection with other methods, well known to the veterinarian, should make a diagnosis of vomition as a result œsophageal dilatation an easy matter. If we now pass to the subject of true gastric vomition in the horse, we find various conditions and circumstances which may give rise to this deviation from the normal. Colic resulting from overfeeding is sometimes accompanied by vomition, as a result of relaxation of

the cardia. Further, gastric ulceration, calculus, peritonitis, and mechanical obstructions of various kinds, may produce the same effects.

From the above it is evident that true gastric vomition may result from any cause producing over distention, or relaxation of the cardia, as has also been observed by Toegel.[1]

As regards the symptoms of rupture of the stomach, great diversity of opinion existed at one time, and still exists among many veterinarians. Many think, as already indicated, that vomition is not the cause, but the result of rupture of stomach. Ordinarily, when rupture of the stomach is spoken of, it is interpreted as meaning a complete separation of the three coats of that organ.

It requires no special veterinary training to comprehend that vomition is a physical impossibility when true rupture of the coats supervenes. Yet, as has already been mentioned, many believe that this is a possibility. On the other hand, it is clear, as Dickerhoff[2] also acknowledges, that true vomition may occur where the muscularis has suffered complete separation, provided the mucosa remains intact.

In such instances, vomition results from antiperistaltic movement and relaxation of the cardia, and persists as long as the mucosa withstands the pressure of the food contained in the stomach. It is obviously admissible only to speak of a vomition resulting from a partial rupture of the coats of the stomach, and not of a vomition resulting from complete gastric rupture, which cannot take place, as already indicated. It is evident that a correct diagnosis, between simple gastric vomition and vomition resulting from a partial rupture of the stomach, offers great difficulties in the early stages of the sickness. It can only be determined by carefully watching the progress of the disease, and it was by this method that I was enabled to form a definite opinion of the vomiting in the case which came under my notice. The above comprises the more salient points in the diagnosis of vomition in solipeds, and I believe if the suggestions offered in this paper are adhered to, further confusion in this matter will be obviated.

Sixty-second st. and Elmwood ave.,
Philadelphia.

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[1] "Dickerhoff Lehrbuch der Specielen Pathologie." Berlin 1892.
[2] l. c.

A FEW OBSERVATIONS ON INTERNAL PARASITES OF THE DOMESTIC ANIMALS.

By Arthur S. Wheeler, A. B., V. M. D.,
Meat and Cattle Inspector for the New Orleans Board of Health.

Filaria Immitis:—This parasite is one of the most frequent, if not the only cause of dropsy in our southern climate. Although my experience in canine practice is very limited, yet the eight cases of dropsy that have fallen into my hands have invariably evinced the same general symptoms and on post mortem have revealed the same pathological changes.

Furthermore, the history of this disease, as gleaned from our local huntsmen, bears out the theory of its ætiology advanced by Neumann, viz: That it occurs most frequently in marshy countries, and that its intermediate host is concealed in the drinking water. For, of all dogs the hunter is the most common victim of this filaria, and the hunter is most exposed, by virtue of his habits, to the above conditions.

The following is a *résumé* of eight cases:

Symptoms.—These are most unsatisfactory unless ascites be present. There is usually a husky cough, accompanied by some distress of respiration. Appetite may remain good until nearly the end, no fever, pulse as unreliable as it generally is in dogs, and bowels reveal nothing. If there is any one symptom more pathognomonic than another, before dropsy manifests itself, it is the shortness of breath, with asthmatic paroxysms. There is usually a livid color of the tongue and visible mucous membranes after extreme exertion, and occasionally a convulsion or asphyxiation.

Pathological Anatomy.—The heart and larger blood vessels are the principal seat of disturbances. I have noticed these worms in both ventricles, both auricles, the aorta, the pulmonary artery and the lungs. The liver and spleen also show morbid changes. In one instance, both heart and lungs were pierced by these worms. In another case there was a cavity in the left lung about the size of a pecan nut containing a nest of filariæ. The spleen was studded around its entire edge with blackish lumps interspersed with one or two white ones. These nodules were about the size of a pea,

homogeneous in structure, and contained what seemed to be embryos of the filariæ. The lungs have a peculiar ashen color; the liver is very dark and cirrhosed. There is more or less amber-colored serum in both the thoracic and abdominal cavities.

How long it takes these worms to develop fatal symptoms depends on their number and location. Two cases lived more than a year after the dropsy appeared. One of these, a pug bitch, whelped in this condition, giving birth to two puny pups, which lived but a few days. After decided symptoms develop, as dropsy and labored respiration, death generally ensues in about two weeks. Treatment is of course, nil.

Nitro-glycerine in 1-400 grain dose will relieve the paroxysms.

THE EFFECTS OF CASTRATION UPON THE PROSTATE GLAND.

By Ellwood R. Kirby,

Assistant Instructor of Clinical Surgery in the University of Pennsylvania.

It was suggested some time ago that possibly, if there exist an analogy between uterine fibro-myomata and prostatic overgrowth as supposed by some, castration might have the same effect upon the prostate gland as oöphorectomy does upon the uterus, and cause a shrinkage or atrophy, resulting in a practical disappearance of the enlargement.

As no reference had ever been made to the subject, I made a series of experiments in conjunction with Dr. J. William White, the results of which are here subjoined.

In the experimental work dogs were used, partly for convenience, and partly because it is known that in this animal, the prostate occasionally undergoes changes similar to those found in the human subject.

The literature was carefully looked up, and no reference as to the average or normal weight of the prostate in dogs could be found.

For control experiments thirty-five dogs and their prostates were weighed, and the average weight taken as a standard.

The average weight of the prostate of the thirty-five dogs examined was 15.374 grammes.

The influence of castration upon the prostate was examined in eleven dogs.

1. The first dog was killed on the 17th day after castration, weight, 15 kilos. The average weight of the prostate in dogs weighing from 14 to 16 kilos inclusive was 15 grammes. The weight of the prostate in animal number one was 5.420 grammes.

2. Weight of dog, 14 kilos. The average weight of the prostate in dogs weighing from 13 to 15 kilos inclusive, 13 grammes. The dog was killed 21 days after castration, and the prostate found to weigh 5.700 grammes.

3. Weight of dog, 14 kilos. Killed 30 days after castration; weight of prostate, 2.600 grammes.

4. Weight of dog, 20 kilos. Average weight of dogs weighing from 19 to 21 kilos inclusive, 19 grammes. Killed 32 days after castration; weight of prostate, 2.620 grammes.

5. Weight of dog, 15 kilos. Average weight of prostate in dogs weighing from 14 to 16 kilos inclusive, 15 grammes. Killed 41 days after castration; weight of prostate, 5.700 grammes.

6. Weight of dog, 31 kilos. Average weight of prostate in dogs weighing 29 kilos and upwards, 30 grammes. Killed 54 days after castration; weight of prostate, 4.420 grammes.

7. Weight of dog, 23 kilos. Average weight of prostate in dogs weighing from 22 to 24 kilos inclusive, 21 grammes. Killed 54 days after castration; weight of prostate, 2.700 grammes.

8. Weight of dog, 15 kilos. Killed 60 days after castration; weight of prostate, 1.500 grammes.

9. Weight of dog, 22 kilos. Killed 61 days after castration; weight of prostate, 4.000 grammes.

10. Weight of dog, 25 kilos. Average weight of prostate in dogs weighing from 21 to 29 kilos inclusive, 21 grammes. Killed 65 days after castration; weight of prostate, 4.500 grammes.

11. Weight of dog, 26 kilos. Killed 72 days after castration; weight of prostate, 3.920 grammes.

The average weight of the atrophied prostate gland in the eleven dogs experimented on was 3.916 grammes. If we compare this average with the average weight of the normal gland, which was found to be 15.347 in thirty-five cases, we find that the average loss of weight consequent upon castration to be 11.458 grammes. This average, of course, holds good only for the above eleven animals when compared with the average of the normal gland of the thirty-five animals used in the control experiments.

Griffiths contributes four observations of his own, two in the dog and two in the cat, the castration having been performed for other reasons years before, in all of which the prostate had been transformed into a mass of fibrous connective tissue. He also examined the generative organs of the pig, bullock, sheep and horse after castration, and found that in each case like changes had supervened.

Hunter made the interesting observation that the prostate gland of the mole in winter is hardly discernible, but in the spring becomes very large and filled with mucous.

Owen confirms this and adds that the prostate of the mole begins to increase in February, acquiring an enormous size and entirely concealing the urinary bladder toward the end of March, showing the relation of the size of the prostate to the functional activity of the generative organs.

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EDITORIAL.

Sufficient time has now elapsed since the last annual meeting of the United States Veterinary Medical Association, held in Chicago, October 16 to 20, to enable us to fully digest the great work done there, and to determine its importance to the veterinary profession.

While the meeting was a great success and was attended by more members of the association than any previous meeting in its history, and while the resolutions adopted and papers read were of greater value and significance than those presented at any former meeting, it may as well be confessed that the International Veterinary Congress, which was to be held coincidently with meetings of the association, was a failure. The numerous letters received by the secretary from foreign veterinarians showed that it had excited some attention abroad, but none of the prominent veterinarians of other countries, except Canada, honored the Congress and themselves by their presence.

While it is possible to hold large medical congresses every three years, it seems to require an occasion of extraordinary importance, and signs of approaching calamity to the interests guarded by the veterinarian, to make an International Veterinary Congress possible.

Alarm caused by the ravages of Rinderpest and Lung Plague have been the usual incitants for the veterinary congresses of the past. Nearly all civilized lands are at present remarkably free from contagious diseases among their domestic animals, and while other questions of the gravest moment require consideration and concerted action, they are comparatively new, as international questions at least, and have not been sufficiently discussed by practitioners at large to have their surpassing importance brought to public view. Within five years it will be possible to call an International Veterinary Congress for the consideration of the very subjects so wisely selected for the Congress in Chicago (Tuberculosis, Animal Foods and Veterinary Education) and bring a large and interested gathering of representative veterinarians from all parts of the civilized world.

Our International Congress was a failure because we were ahead of the times. Medical congresses are favored by the fact that many physicians are sent by their governments to represent them and to learn of new discoveries and methods for the prevention of disease.

As yet, the value of the veterinarian's work as regards meat, milk and dairy inspection has not been fully recognized. When this recognition comes, more public positions and influence will fall to our lot, and more delegates from the government will be some of the desirable results.

The large and enthusiastic meetings of the United States Veterinary Medical Association lost none of their importance and influence, however, through the failure of the International Veterinary Congress. It was evident to all present that the influence of the association is constantly growing, and that its resolutions and regulations receive more respect and support than ever before.

The past history of the association has been one of conservatism and deliberation ; its growth has been slow but firm ; it has made few mistakes, and has thus gradually reached a position in which it commands and deserves the admiration and loyal support of the greater portion of the veterinary profession.

The papers read at the Chicago meeting were of great scientific and practical value, but as they have been published in full in the veterinary periodicals, it is unnecessary to say more about them here.

The applicants for membership were thoroughly sifted by the Comitia Minora, and only those who had conformed strictly to the requirements were reported favorably.

A resolution declaring the United States free from Lung Plague of Cattle was unanimously adopted, after it had been shown in a paper by Dr. Jno. W. Gadsden, in which were recorded the results of his exhaustive investigations, and by the testimony of veterinarians from all parts of the country, that such was undoubtedly the case.

Some remarks by the secretary in reference to the passing of the Bureau of Animal Industry into the hands of the politicians were well received, and a resolution deploring this unfortunate turn of affairs was adopted with but one dissenting vote. A new departure was inaugurated by the appointment of a committee to settle, so far as the association can, the nomenclature

of the infectious swine diseases. This, as was ably shown by Professor Welch, of Johns Hopkins University, is a matter in which the utmost confusion exists, and the adoption of a standard nomenclature by the association will go far to make the whole subject of swine diseases more clear. There are other diseases that it would be well to re-name, and perhaps it can be effected in the same way.

A committee was appointed to arrange for a convention, at some central point, of representatives from all of the veterinary schools in the United States and Canada, in the hope of adopting a minimum of requirements for matriculation, and a minimum course of study. It is to be hoped that all of the schools will give the committee their hearty support, and that good will result from their efforts. The place for holding the next meeting was not settled, but was left to a committee. The general understanding is that it will be somewhere in the East. The choice of officers was most happy, and all are confident that the affairs of the association will be well conducted. Dr. W. Horace Hoskins, who has so ably filled the office of secretary, with its trying duties, and has exerted such a powerful influence for the advancement of the association, was most appropriately and logically elected president, by a unanimous vote. Dr. A. W. Clement was re-elected vice-president, Dr. Turner was called to take up the difficult work laid down by Dr. Hoskins as secretary, and should have the cordial assistance of all members. It is hardly just to ask one to do all the work of this office gratuitously, and it would be well to attach a suitable salary to the position. Dr. Robertson was re-elected treasurer. When the meeting closed it was evident to all that four days would be required hereafter for a proper consideration of the increasing work of the association.

We went away with a stronger realization of the dignity and importance of the veterinary profession, and of the great opportunities that are open before us.

ABSTRACTS.

MILK INSPECTION.

In the *Zeitschrift für Fleisch und Milch-Hygiene* (July and August, 1893), Benno Martiny discusses the subject of Milk Inspection as it presents itself in Germany. M. considers the subject (1) from a hygienic and (2) from an economical standpoint. By healthy or normal milk is to be understood fresh, unchanged milk from healthy cows, and uncontaminated, *i. e.*, containing neither macroscopically recognizable foreign matter, nor microscopic disease-germs; further, it must be free from preservatives. Milk from healthy cows three to five days after calving is to be regarded as unhealthy milk.

Adulterated milk is milk that is taken at different periods of one milking; further, skimmed milk and also milk that has been mixed with any foreign substance. Considered from an encomical point of view, milk must remain unchanged for a reasonable length of time, and it must be rich in those constituents which determine its worth as food-stuff.

The percentage of the various constituents of milk, which is to be used as a standard, must be determined by the average percentage of the milk produced in a certain district. This is the only method by which the market value can be determined.

Milk in North Germany shows an average of 3.3 per cent of fat in 12 per cent dried total—solids—which represents a specific gravity of 1031.5. In Southern and Central Germany the average percentage of fat is 3.5 in 12.4 per cent of solids.

M. believes that in view of the fact that the percentage of fats may be increased to more than four percentage in 13 to 14 per cent total solids by appropriate feeding, the required standard of three percentage of fats and sp. gr. of 1030. is not too high for Germany. M. states that in Canada the standard requires 3.75 per cent of fat and in Massachusetts 4 per cent, and 13 per cent dried solids.

It is the opinion of M. that, under the circumstances attending the sale and delivery of milk in large cities (he has

reference more particularly to conditions in Germany), a practicable system of milk inspection is impossible.

In the city of Berlin (exclusive of the suburbs), 340,000 to 350,000 liters (liter = 2.113 pints) are used daily, which equals about one-fifth liter per individual. This quantity is handled by 250 milk dealers, and produced by 300 dairies. The examination of milk for adulterations, for percentage of fat and albumen, and the examination of the dairy animals, he holds to be impossible under the existing conditions.

In Berlin, ⅓ per cent of the total milk supply is subjected to analysis, and despite the fact that the methods of examination are extremely crude and superficial, the average number of complaints for selling unhealthy and adulterated milk amounts to one hundred cases every month. M. believes that even if more stringent measures were adopted, this state of affairs would hardly be altered.

An examination of the question as to the most practicable method of analyzing market milk shows that this can only be answered in connection with the question as to how milk should be furnished in large cities.

M. comes to the conclusion that if the impossibility of a rational and practicable system of milk-examination depends upon the aforementioned circumstances, it can only be overcome by limiting the number of milk purveyors, as is done in both England and Italy.

M. is aware that an immediate revolution of this kind is hardly to be expected, and turns therefore to the consideration of the question of the most useful methods of milk-examination under the present circumstances.

M. remarks: Proceeding from the fact that the sp. gr. of mixed milk from more than four cows of the dairy is between 1029 and 1034, it is customary to look upon a specimen of milk of less sp. gr. as being watered, and one showing an increased sp. gr. as being skimmed.

However, it must be borne in mind: 1st, that by simultaneously skimming and watering the milk, it can be kept at its original sp. gr., if for every one part by weight of removed cream, about 3¾ parts by weight of water are added; and, 2d, that, on the one hand, poor yet unadulterated milk may be met with showing a sp. gr. between the limits of 1029 and 1034, on the other hand that perfectly normal and healthy milk may show

a sp. gr. deviating from the standard percentage. The sp. gr. is taken at 15° C. A rough estimate of the milk is to be made by the inspector; if it be found to show any evidence of adulteration, it should be thoroughly examined by exact chemical methods.

One of the methods mentioned for the determination of the amount of water which has been added to milk is the test for nitric and nitrous acids by means of the diphenyl-reaction.

M. mentions the so-called stable test practiced in some parts of Germany. It consists in superintending the milking of the cows of a dairy in which watered or otherwise adulterated milk has been found, testing the milk and comparing the results with those given by the first examination. This test pre-supposes that the various constituents of the milk are secreted in like amount day after day. Experiments made at Kiel have, however, shown this test unreliable, for it was proved that milk taken from the same animals on two consecutive days, showed one day total solids to the extent of 16 per cent, and on the following day, 14.7 per cent. Further tests should, however, be made ere this method is entirely discarded as a practical milk-test. It is a singular fact that these experiments have neither been mentioned nor repeated by other observers.

There can be no doubt as to the correctness of the observations made at Kiel, but it would be of great interest to determine the frequency of the deviations, and, if possible, the cause of these deviations.

It is not clear whether a small herd of cattle would give better results in such an examination than a large one. A small herd is more easily kept under the same conditions, but, in a large herd, individual deviations are obscured by the average normal of the entire herd.

The conditions and circumstances which must be taken into consideration in making an experiment as suggested above are: disturbances in the digestion and assimilation of food, changes of temperature, and other climatic variations, as wind and rain.

The paper is concluded with the following remarks:

1. The sale of milk should only be allowed by officially designated dealers.

2. Appointments should be restricted to persons giving evidence of a knowledge of the demands of such an establishment, both from a hygienic and economical point of view.

3. The inspection of milk should not be confined simply to the market milk, but should also be extended to the dairies.

4th. In every city a well-supported laboratory should be established for the scientific examination of milk.

ANNUAL REPORT OF CHIEF VETERINARIAN OF THE HOLLAND ARMY.

A great many interesting points in reference to the diseases of the horses in the Holland army are brought out in the last statistical report by Lieutenant-Colonel Hinze, chief veterinarian. The report is reviewed at length in the *Zeitschrift für Veterinarkunde* for November, 1893.

During the year, 5470 horses were treated, 983 for internal diseases and 4487 for surgical conditions. Of these ninety-four per cent were cured. The remaining six per cent either died, were destroyed or sold.

All of the new horses were exposed to strangles in various ways and eighty-five contracted the disease, nine of which died. Death was caused in seven of the nine fatal cases, by a complication of metastatic pneumonia, and in the remaining two by suppuration of the mediastinal lymph gland, and discharge of pus into the thoracic cavity.

Nineteen cases of acute rheumatism were treated and fifteen recovered. As suffering from diseases of the respiratory tract 272 horses were treated, fifty-one of these were roarers, and the condition could be traced, in many cases, to a previous attack of strangles. None of the cases were found to be due to œdematous pneumonia. Eighteen of these roarers were so slightly affected that they were put to work and the trouble gradually disappeared. Thirty-three were treated and seventeen cured, while the others were sold. The opinion is expressed that when roaring is a result of strangles or œdematous pneumonia the disease can be cured by the use of iodide of potash and strychnia. Four hundred and five cases of disease of the digestive tract were reported. One veterinarian records most excellent results from the use of sodio-benzoate of caffeine, in doses of ten gr. daily in cases of the loss of appetite and depression without other symptoms of disease.

Colic was usually treated with pilocarpine, but it is stated that while pilocarpine is almost universally conceded to be the

best drug in colic, there are certain cases of obstinate constipation that are not helped by it, and then aloes must be resorted to.

In contradistinction to the derision that a diagnosis of shoulder lameness calls forth in this country, 120 horses are reported to have suffered from this complaint. These were treated with douches of cold water, rest, and subcutaneous injections of the oil of turpentine.

When, in cases of sprain of the fetlock joint the usual modes of treatment, as cooling applications, bandages and massage were unsuccessfully applied, it was found that a plaster of Paris bandage gave good results.

Veterinarian Rynberg reports the case of a young mare which kicked constantly and could not be groomed on account of her viciousness. A subcutaneous injection of morphia was made, the mare cast and the clitoris, together with the corpus cavernosum was excised with a thermo-cautery. The wound healed rapidly and the result of the operation was favorable, as the animal became quiet and could be ridden with comfort. Encouraged by the result, the same veterinarian amputated with curved shears, the free portion of the clitoris of four mares which were more or less vicious and dangerous to use. The small wound made in this way soon healed. Two of the mares improved and could be used without danger, while two were not affected by the treatment. Other causes must have existed in the last two.

A CASE OF CONGENITAL TUBERCULOSIS.

In the *Zeitschrift für Fleisch und Milch-Hygiene III*, 7, Veterinarian Shaner, meat inspector in Summerfeld, reports the following case :

Within the last few years a number of unquestionable observations have revealed the existence of a number of cases of congenital tuberculosis. I am impelled to record the following case that came under my observation on account of the high degree of the tuberculous infection, and because the general distribution of the disease must be designated typical :

Female calf, about eight days old, of a low-land breed. Nutrition very bad, subcutaneous and peri-renal fat scarcely developed. Muscles very moist and of a pale yellowish color. The serous membranes were shiny. In the lungs and liver numerous

tubercles from the size of a pin head to that of a pea; some caseous throughout and some only at the centre. In the spleen three sharply outlined tubercles of the size of a pea, with a little calcareous material deposited at the centres. The bronchial and mediastinal lymph glands enlarged (the latter to ten times the natural size) and caseous throughout. The portal lymph glands fifty times the normal size and nearly half as large as the liver itself. The section of these glands showed that they contained numerous caseous foci surrounded by hyperplastic tissue. The same alterations, save with less enlargement, were found in the caudal and cervical lymph glands, the lumbar glands, the right iliac glands, the lymph glands of the fold of the right flank, and the right supra-mammary lymph glands. Pleura, peritoneum, kidneys, bones and joints were intact.

Smear preparations of the cheesy lymph glands revealed no tubercle bacilli, but they were found in great numbers in the fresh embolic foci in the lungs and liver.

From the anatomical alterations described it must be assumed that the primary infection of the fœtus took place through the umbilical vein, that the portal lymph glands were first affected, and that the other diseased centres arose from a second infection by way of the umbilical vein, or that the diseased portal glands led to a generalization of the disease.

In reference to the ancestry of the calf:—The dam is said to have coughed some, but to have shown no other signs of disease. The sire was said to have been healthy.

ANEURISM OF THE AORTA.

Aneurism of the main trunk of the aorta is less frequent in the domestic animals than in man, on account of the spiral course of the aortic arch in the latter. However, a few interesting instances have been observed in the lower animals.

Bleich[1] observed an aneurism of the abdominal aorta in an eight-year-old horse, which had contracted inflammatory adhesions with the stomach and liver and terminated in hemorrhage into the stomach. No characteristic symptoms were observed during life, excepting frequent attacks of coughing, accompanied sometimes with a small, at times with a copious.

[1] Zeitschrift f. Veterinarkunde, 1889, p. 112.

discharge of blood, loss of appetite, great weakness, and emaciation. The lungs contained hemorrhagic nodes.

Schmidt[1] mentions an aneurism and rupture of the aorta in the horse. He was able to eat from the ground only with evident pain, though the movements of the head and neck were normal ; the gait of the hind extremities was stiff and straddling ; the pulse beats 60 per minute ; the heart beats were synchronous with a humming, " brewing " sound, which was most distinct on a level with the vertebral column ; animal was debilitated and emaciated. Post-mortem : The pleural cavities were filled with coagulated blood ; the posterior aorta at the point where it reaches the dorsal vertebræ was the seat of a sacular dilatation of the size of a man's head, and on its inferior surface was an irregular laceration 6 cm. long ; the aortic walls were thin, fragile, and covered on the inside with red granulations. Nocard,[2] Godfrin,[3] and Skinner[4] mention cases. In Nocard's case the origin of the posterior aorta and the pulmonary artery in a dog ten weeks old was the seat of an aneurism with secondary cardiac hypertrophy. He gradually emaciated and coughed continually. In two foals the aneurism was discovered through the rectum by digital examination. An eighteen-year-old horse had an aneurism of the carotid artery opposite to the sixth cervical vertebra ; death from rupture.

THE IMPORTANCE OF THE SUBMAXILLARY GLAND IN THE EXAMINATION OF HOGS FOR TUBERCULOSIS.

Under the above title, Veterinarian Voelkel contributes the following in the *Zeitschrift für Fleisch u. Milch Hygiene*, July, 1893 :

In the abattoir at Elbing 2315 hogs were killed from December 5, 1892, until March 21, 1893. Out of this number, 91 animals (3.9 per cent) were found to be affected with tuberculosis. Two animals were affected solely with lung tuberculosis, while the remaining 89 showed both thoracic and abdominal tuberculosis.

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[1] Archiv. f. Thierheilkunde, 1889, p. 295.
[2] Recueil de méd. vét.. 1891.
[3] Belgische Annalen, 1888.
[4] Zeitschrift f. Veterinärkunde, 1890. p. 59.

In addition to this, the entire 89 proved to have tubercular lesions of the submaxillary glands. The latter seems, therefore, to be the favorite seat for the development of primary tubercular lesions, as Voelkel remarks.

The frequency of the occurrence of tubercular submaxillary glands in this series of investigations leads Voelkel to the belief that the method for examination will admit of being very much simplified. The examination of the submaxillary glands, Voelkel declares, will do away with the necessity of an examination of the mesenteric glands, for it was found that in no instance where affection of the mesenteric glands could be demonstrated was there an absence of submaxillary affection.

It is the opinion of Voelkel that an examination of the submaxillary, bronchial and portal lymph glands is sufficient to prove whether or not the hog is affected with tuberculosis.

Exception to these conclusions are taken by the editor of the *Z. f. F. u. M.* He believes that until Voelkel's observations have been duplicated by other observers it would be premature to discard the examination of the mesenteric glands, which he believes to be the most reliable method.

PARASITES OF THE EYE.

Dr. P. Willach publishes a long and very interesting article on the Etiology of Diseases of the Eye, with especial reference to the periodic ophthalmia (moonblindness) of the horse, in the *Archiv. f. Wiss. u. Pract. Thierheilkunde*, Bd. XVIII, Heft 5.

Thirty-five eyes from twenty-four horses were examined as to the cause of the inflammation affecting them. Of these a large proportion were from cases of periodic ophthalmia. Lesions of the greatest variety were found and as a result of the very extensive study the following conclusions were reached:

Most of the inflammations of the internal parts of the eye of the horse, including periodic ophthalmia, are of parasitic origin.

As a rule, the inflammations of the eye are caused by animal parasites. These parasites are: Trematodes (Distomati), Platodes, (Cysticerci), or Nematodes (Rhabditi, Filariæ), and can be found in the pathologically altered parts either macroscopically (rarely) or microscopically (usually).

The origin and development of these parasites is unknown, but it is probable that they enter the body with the food or water, or come from the pasture.

Periodic ophthalmia is not inherited from stallions. Infection can take place through the dam, however, whether her eyes are affected or not.

In advanced chronic alterations it is probable that in most cases, even when it is impossible to discover a parasite, the eye trouble was caused by a parasite that had disappeared.

If, in addition to the alterations in the internal eye there is a wound or scar on the cornea, the trouble may be ascribed to the traumatism and to the influence of vegetable micro-organisms.

VOMITION IN THE HORSE.

A case reported under the above title by Army Veterinarian Duvinage (*Zeitschrift für Veterinarkunde*, April, 1891) will be found interesting in connection with the paper on the same subject published by Dr. Schreiber in another place in this magazine.

A seven-year-old cavalry mare was found vomiting. The vomition movements were intense and lasted for minutes at a time. During the intervals the animal coughed and showed great depression. After six hours vomiting ceased, but the animal perspired freely over the entire body.

The visible mucous membranes and sclerotic veins were intensely injected. Temperature 100.4° F.; pulse weak; arteries hard, and pulse wave short. Pulse rate, 72 per minute; respiration superficial and 48 per minute. In the lower third of the cervical region a tumor the size of a fist was found. Animal died in twelve hours.

The post mortem examination showed a collection of one-half liter of fluid of red color in abdominal cavity; in the small intestines a tumor consisting of impacted food material; the stomach distended by gas to three times its natural size. The stomach was intact at all points; however, the left pillar of the diaphragm showed a rupture through the muscular portion five inches in length. The cervical tumor mentioned above was found to consist of a collection of food in the œsophagus. The vomition noticed in this case was undoubtedly brought on by

the immense development of gas in the stomach, which, in all probability, resulted from the intestinal impaction referred to above. The gastric distension very likely produced the diaphragmatic rupture which, when it occurred, made further vomition impossible.

A STUDY OF TUBERCULOUS MILK.

In numbers 2 and 3 of the 3d volume of the *Deutsche Zeitschrift für Tiermedizin*, Veterinarian Friis reports a study of some of the milk sold in Copenhagen.

It seems that in Copenhagen the law provides that the milk from a dairy shall be excluded from sale when it can be shown that a "dangerous infectious disease exists among the persons employed in the dairy or among the cattle."

In order to determine the scope of the law, Friis tested the Copenhagen milk in respect to its tuberculous virulence.

In all, 46 samples of milk from 44 herds, of from 10 to 80 cows each, were injected into 84 rabbits and four guinea pigs. About one third of the samples were examined microscopically for tubercle bacilli, but none were found. Of the experimental animals, 57 rabbits and all of the guinea pigs died shortly after the injection, so that 18 samples of milk were lost and but 28 remained for further study. Of these, four (one seventh of the whole number) caused tuberculosis. Two of the virulent samples came from herds comprising 30 and 20 cows respectively, and in each case of these herds there was but one suspicious cow. The other two virulent samples caused more violent reactions and came from herds in which it could be shown that some of the cows had tuberculous udders. One of the latter herds contained twenty emaciated cows, two of which had tuberculous udders but supplied apparently normal milk. The other herd was made up of thirty cows in good condition, but one had tuberculosis of the udder.

These experiments are taken to show that by mixing the milk from a herd the virulence is not destroyed. It also furnished new evidence of the fact that consumers of milk are in constant danger of infection, and will be until all dairies are subjected to veterinary inspection.

THE INNOCUOUSNESS OF THE MEAT OF ANIMALS AFFECTED WITH TETANUS.

Sormani, in his investigations of the action of the digestive secretions in the alimentary canal upon the tetanus bacillus, conducted a series of experiments as to the effects of the meat of animals which had died from tetanus, when eaten by healthy individuals. He fed animals not only with pure cultures of the bacillus, but also upon the meat taken from the cadaver. In such cases no injurious effects could be observed, whether the acidity of the gastric juice remained undisturbed or whether it was neutralized by carbonate of sodium, and concludes that the meat of animals suffering from this disease may be consumed with impunity. (Before arriving at a positive conclusion, however, it is necessary to ascertain the results in case there may be abrasions of the mucous membranes of the mouth or the pharynx.)—*Centralblatt f. allgem Pathologie u- pathol. Anatomie.*

A CASE OF GLANDERS IN MAN.

Dr. Holmes reports in the *American Medical Journal*, August 12, '93, a case of glanders in man which was contracted by handling two horses that subsequently died of the disease.

The first symptom noticed was an inflammation resembling a felon on one of his fingers. This was followed by five suppurating foci in different parts of the body. These appeared three weeks after the appearance of the inflammation of the finger. Temperature was increased to 100° F. and pulse to 92. Guinea pigs were inoculated and died of typical glanders. The treatment consisted in opening the abscesses, applying sulphate of zinc, and iodoform gauze saturated in potassium iodide. The man recovered.

THERAPEUTIC NOTES.

DEODORIZED IODOFORM.

To deodorize iodoform the following combination is given in the supplement of the Holland *Pharmacopœa:* Iodoformii, 197.0 grm.; ac. carbolici, 1.0 grm.; ol. menth. pip., 2.0 grm.

CAMPHOR AS AN ANAPHRODISIAC.

For chronic œstrum in mares, camphor has frequently been recommended. A convenient way of giving it is to moisten it with ether or alcohol, pulverize finely and mix with althæa mucilage and water to form balls. In this way 5 drachms can be given daily.

LOCAL ANÆSTHETIC.

The following has been recommended for producing local anæsthesia, and, since it is really very good, it will bear printing again. Chloroform, 10 parts; ether, 15 parts; menthol, 1 part. Directions: Spray the seat of operation for one minute before making the incision.

MENTHOL IN ITCHING AFFECTIONS OF THE SKIN.

The local use of menthol is recommended by Colombini (*La France Medicale*, November 22, '93.) in itching affections of the skin in human subjects. It will undoubtedly prove equally as effective in the treatment of like affections met with in veterinary practice. It is prescribed in the following form: ℞ Menthol, ʒii; Alcohol, ʒiii; or ℞ Menthol, Oil sweet almonds, āā ʒii.

ANTISEPTIC MIXTURE.

Cavazzini (*La France Medical*, 40 anne, No. 22) recommends the following as an antiseptic dusting powder, free from disagreeable odor: Iodoform, 55 parts; Salicylic acid, 20 parts; Subnit. Bismuth, 20 parts; Camphor, 5 parts.

A PATENT MEDICINE.

Ellman's Royal Embrocation is, according to a quotation from Stern's *The New Idea*, made as follows: Take of ol. terebinth, ½ ounce; ol. thymi, 3 drachms; ol. succini crudi, 1 drachm; castile soap, 130 grains; caustic potash, 10 grains; water to make, 1 pint.

The soap and caustic potash are first dissolved in a little hot water, the oils are then added slowly, and enough water to complete the quantity.

HYDROGEN DIOXIDE AS AN AID IN THE DIAGNOSIS OF SUPPURATING SINUSES OF SOFT TISSUES.

Dr. W. M. L. Coplin, (*Therapeutic Gazette*, October 16, '93), recommends the use of hydrogen dioxide in the diagnosis of sinuses and fistulæ. When dioxide of hydrogen comes in contact with necrotic tissue, gas is liberated. Coplin claims that the injection of this substance into a sinus produces an inflation to such an extent that its size and direction may be easily outlined by percussion and palpation.

Aside from its diagnostic value it is one of the most efficient drugs in the treatment of fistulæ.

CHLORATE OF POTASSIUM AS A GALACTAGOGUE.

Alexander Harkin reports in the *Bulletin General de Therapeutique*, December 30, 1892, some experiments he performed on cows with chlorate of potassium. Eight animals were fed for four days upon a definite amount of food, and the amount of milk secreted in twenty-four hours carefully noted. In a second period, which lasted twelve days, the animals were fed on the same amounts of food and two drachms of chlorate of potassium added to the food three times a day. Harkin claims to have noticed an increased milk secretion during the potassium period.

TREATMENT OF CHOREA BY LARGE DOSES OF QUININE.

About a year ago Dr. H. C. Wood published a paper in which he gave the results of some experiments made with quinine in

the treatment of chorea in the human subject. Quinine when given in large doses in cases of chorea produces an immediate improvement, due, it is thought, to stimulation of the inhibitory nerve centre, but in time the involuntary contractions become as severe as before the treatment. Better results were achieved where the quinine administration was combined with the exhibition of cod liver oil and iron. Further investigations are necessary ere a definite conclusion as to its worth can be formulated, but it is evident that even if its effects are only transient it will be insured a place among the drugs in the treatment of chorea both in human and veterinary medicine.

ANTHELMINTICS.

Tartar emetic, five drachms daily in the drinking water, still has the preference as an anthelmintic in the horse. By many, arsenious acid in doses of thirty to forty grains is preferred as a safe and efficient anti-thelmintic remedy. Areca nut, male fern, and kamala are the best anti-tænia in the dog. The first is administered in pill-form in ten-grain doses mixed with cacao butter and yellow wax ; the oleoresin of male fern is given in gelatine capsules in doses of eight to ten minims. (℞ Sem. Arecæ 15 gm. Butyr. Cacao, Ceræ flav., q. s. Fiat bol. No. XX.)

Kamala, on account of its easy administration, its non-toxic effects and purgative action, which avoids the necessity of following it with a carthartic, is the most efficient remedy against the tape-worm. Koso and pomegranate rind are seldom prescribed. As a remedy against lumbricoid worms in the dog, santonin is, according to experience, more efficient when prescribed in conjunction with castor oil. It will thus pass through the stomach without being absorbed, and the mixture is at the same time laxative. ℞ Santonini, .3 gm., Ol. Ricini, 50 gm. M. Teaspoonful three times daily for a small dog ; tablespoonful for a large dog. (Monatshefte f. pratische Thierheilkunde.)

CONSUMPTION OF THE MEAT OF POISONED ANIMALS.

Pilocarpin.—(1) A rabbit weighing 1½ kg. received .2 gm. (3 grs.) of hydrochlorate of pilocarpin subcutaneously in two

divided doses. When the toxic symptoms had reached their height, the subject was killed to prevent excretion of the alkaloid by the salivary glands. The meat, free from bone, weighed 700 grams (½ of the body-weight) and, theoretically, contained .1 gm. of the drug. A dog weighing ten kg., after fasting consumed the meat in one-half of a day without any apparent physiological effects, not even salivation.

(2) A sheep weighing 33 kg. received subcutaneously .25 gm. of pilocarpin, a fatal dose, and was afterwards killed. A dog 25 kg. in weight ate three pounds of the raw meat in three days without any ill effects. The experimenters themselves ate one-half of a pound of the fried flesh with impunity; its taste was normal.

A chemico-physiological analysis, according to Dragendorff's method, was made qualitatively and quantitatively of 700 gms. of muscle, 500 gms. heart-muscle and kidney, and 500 gms. liver. The three resulting extracts did not respond to the chemical reaction of pilocarpin; they should have contained, theoretically, 5 mg. and 4 mg. respectively.

They were given subcutaneously to three mice with negative results, while ½ mg. of pure pilocarpin is toxic. The muscles, heart, liver and kidneys showed no trace of the alkaloid.

Veratrin.—(1) A rabbit weighing 2¾ kg. received subcutaneously .15 gm. veratrin in .8 ccm. of alcohol and died in forty-two hours. 2¼ kg. (.12 gm. veratrin) of meat, liver and kidney mixed and divided into three portions were fed to three bitches (10 kg.) nursing three pups, with no injurious effects.

(2) Rabbit weighing 900 gms. received hypodermically .05 gm. veratrin with .2 ccm. alcohol, and died in seventy-two minutes. 535 gms. (total) of muscle, heart, kidney and liver were treated by Dragendorff's method as before mentioned. Three different chemical reactions showed a trace of veratrin in these organs, which was corroborated by the physiological test. The remainder of the extract, dissolved in .2 ccm. of alcohol and injected into a frog produced tetanic spasms in the hind legs and death in six hours. A control frog died in one hour from 4 mg. of veratrin. Comparing the time required to kill, the 535 gm. mixture should have contained about 1 mg. veratrin, while theoretically it would have been 25 mg.

The innocuousness of the meat of poisoned animals is explained by the chemico-physiological results, in that it contains very little or none of the poisonous agent. The question is what becomes of the poison in the system?

All alkaloids, which are organic, nitrogenous compounds, are altered, oxidized in the animal tissues into harmless compounds and lose their physiological effects. This disorganization takes place, especially in the muscular tissue and still more in the liver; in the case of strychnia the reducing action of the liver is greater than that of muscle, and in the blood less than in either of the other two. To this reducing action of the tissues must be added excretion through the various glands (salivary, gastro-intestinal, mammary, sudorific, pancreas and kidneys). Experiments with strychnia and eserine are identical with those cited above.

The mineral poisons are of less consequence in this respect than the vegetable; the fatal dose of arsenic for man, the most virulent of this class, is ten times greater than that of strychnine. The experiments of Spallonzani and Zappa prove that the meat of animals poisoned with arsenic can be consumed with impunity; the same has been demonstrated with phosphorus. Carbolic acid is rapidly changed into the harmless phenal-sulphate of potassium. Mineral salts, such as lead, mercury, zinc antimony and silver, having a local action on the stomach and intestines, are absorbed only in very small quantities, and have no detrimental effect upon the food-value of the meat. Prussic acid, caustic alkalies and acids are readily changed into harmless products in the blood and other tissues. (Fröhner and Knudsen, *Monatshefte für Thierheilkunde.*)

NEW LITERATURE.

Miscellaneous Investigations concerning Infectious and Parasitic Diseases of Domesticated Animals.—Conducted under the direction of Dr. D. E. Salmon, Chief of the Bureau of Animal Industry, by F. L. Kilborne, Veranus A. Moore, E. C. Schroeder, Theobald Smith and C. W. Stiles. Washington Government Printing Office, 1893.

These miscellaneous investigations are published in a pamphlet of less than 100 pages, and include articles on the following subjects: "Observations on the morphology, biology and pathogenic properties of twenty-eight streptococci found in the investigation of animal diseases," by Veranus A. Moore; "A non-motile pathogenic bacillus, closely resembling the bacillus of hog cholera, found in the lung and spleen of a pig," Veranus A. Moore; "Pathogenic and toxogenic bacteria in the upper air passages of domesticated animals," Veranus A. Moore; "An outbreak of abortion in mares," F. L. Kilborne; "A pathogenic bacillus from the vagina of a mare after abortion," Theobald Smith; "Some experimental observations on the presence of tubercle bacilli in the milk of tuberculous cows when the udder is not visibly diseased," Theobald Smith and E. C. Schroder; "Additional observations on Texas Cattle Fever," by Theobald Smith, F. L. Kilborne and E. C. Schroeder; "Preliminary notes on a sporozoon in the intestinal villi of cattle," Theobald Smith; "On the presence of sarcosporidia in birds," C. W. Stiles.

In the first article by Dr. Moore twenty-eight varieties of streptococci are described and their morphology, methods of growth on various media, reactions to stains, and pathogenesis are carefully considered. These streptococci were obtained from a great variety of sources, including the organs of pigs, fæces of cow, abscesses of pigs, and the tracheal mucous membrane and nasal mucus of horses. It was found that no two varieties acted exactly alike under all conditions, although many of them, upon superficial examination, appeared to be

identical. It was possible to make a natural division into two classes: (1) Those that are strongly saprophytic in all of their properties; and (2), those that have decidedly parasitic tendencies in their morphological and cultural characters. The second class only were found in diseased animal tissues.

The morphological differences between the different varieties were frequently so minute as to suggest that different conditions of life might have caused them.

Of the twenty-eight varieties examined, fifteen of which were derived from the tissues of animals that had died from a known disease, only six were fatal to experimental animals.

It is stated that under certain conditions of weakness with lesions of the mucosa of the air passages or intestinal tract, the streptococci invade the inner organs and cavities of the body.

The work accomplished would seem to indicate that as our laboratory methods become more exact, it will be possible to differentiate into distinct species the pathogenic streptococci which have heretofore been regarded as belonging to the same species. Only those who have done bacteriological work can appreciate the great amount of careful, painstaking labor required to reach the results achieved by Dr. Moore. The paper must be carefully read to be appreciated, and is a great addition to our knowledge of the streptococci; an addition that will help the reputation of American science.

An investigation of an outbreak of abortion among mares is recorded by Dr. Kilborne. Sixteen mares in a stud of about 100 aborted between Dec. 2, 1890, and March 5, 1891. The average age of the fœtuses aborted was 100 days.

Thorough and frequently repeated disinfection of the stalls and external genitals was practiced, after which the outbreak disappeared. The internal administration of the fluid extracts of viburnum prunifolium in doses of one-half ounce daily seemed to have no effect in preventing abortion. A bacillus was found on the vaginal mucous membrane of the last case, a careful study of which has been made by Dr. Smith. The germ bore a remarkable resemblance to the hog cholera bacillus. Cultures of this bacillus were injected into the genital passages of one pregnant mare and two pregnant cows and produced a slight discharge. In one pregnant and four non-pregnant mares the bacillus was not present in the genital

passages. It may be that future investigations will show that this germ has some influence in the production of abortion.

In a thorough and painstaking examination of the milk from six tuberculous cows, with no visible lesion of the udder, Drs. Smith and Schroeder found tubercle bacilli in two instances when the cows were within a few days of death.

Some interesting additions to the excellent and extensive report on Texas fever are made by Drs. Smith, Kilborne and Schroeder, in which it is shown that the blood of cattle from the permanently infected district, kept in the North, is infectious for an indefinite period, known in one case to be three years. It was also shown that the microparasite of Texas fever remained in the blood of an inoculated northern ox for nearly a year. Since the disease caused by a single inoculation of the blood from a southern ox is not always dangerous, and since a single well-marked attack of Texas fever will probably protect from future fatal attacks ; it is thought that an artificial attack may be produced in the fall or winter, when the disease is most apt to run a mild course, and thus protect the animal from a future fatal attack. In other words, the animal would be subjected to a mild attack of the disease, produced by artificial means at a favorable season, to protect it from a subsequent natural attack.

This is an exceedingly gratifying result and should be a source of great satisfaction not only to those who have worked so long and tirelessly on this disease, but to the whole country as well. The discovery of the cause of Texas fever and of the details of the growth and spread of its micro-parasite is one of the greatest achievements of veterinary science in this country.

Dr. Smith described a sporozoon found in the intestines of cattle. The parasites were especially common in young animals and occur as spherical bodies in the tips of the villi of the small intestine. It has not been shown that they influence the health of their hosts, and the study of this new parasite will be continued. The pamphlet is concluded with an article by Dr. Stiles on "Sarcosporidia in Birds."

A new sarcosporidium was found in the muscles of the shoveller and mallard ducks, and was given the name Balbiania Rileyi.

The bulletin is a most meritorious production and should be in the library of every veterinarian and comparative pathologist.

We should indeed be proud of a department of the government service that has been successful in securing the services of a staff of such able scientists as the Bureau of Animal Industry has in its employ, and should be thankful that the management of the bureau has not allowed the commercial tendency of the times to destroy the scientific spirit of its work.

L. P.

PROCEEDINGS OF SOCIETIES.

The Veterinary Medical Association of New Jersey held its thirtieth regular meeting in Morristown, on Thursday, December 14, 1893.

The place of meeting was the United States Hotel. Dr. J. Gerth, the President, was absent, and the meeting was called to order by Dr. Drummond, of Woodbridge, the second Vice-President.

The following members were present: Dr. W. B. E. Miller, Camden, N. J.: Dr. J. W. Hawk, Newark; Dr. James D. Dustan, Morristown; Dr. B. F. King, Little Silver; Dr. W. Runge, Newark; Dr. R. O. Hasbrouck, Passaic; Dr. R. P. Letts, Hoboken; Dr. J. M. Everett, Hackettstown; Dr. M. M. Stage, Dover; Dr. A. W. Axford, Naughright; Dr. H. Exton, Washington; Dr. B. L. Drummond, Woodbridge; Judge Ira Kilburn, South Orange.

Visitors that were present: J. W. Stickler, M. D. Orange, A. VanNest Baldwin, M. D., New Brunswick; G. Swain, M. D., Chatham, N. J.; Dr. Leonard Pearson, Philadelphia, and about twenty stockmen, dairymen and farmers who are interested in the question of tuberculosis, which was one of the special orders of the meeting.

The business of the meeting was first disposed of, and then the following paper on influenza of the horse was read by Dr. Miller, of Camden.

INFLUENZA,

Known as Epidemic Bronchitis, Catarrhal Fever, Shipping Colds, Distemper, etc., but more commonly called Pink Eye, is a blood disease, with both local and constitutional expressions, which may assume different phases, dependent on sundry influences, operating in various ways, generally epizoötic, with a tendency to spread. It is also a panzootic disease, arising in different parts of the world simultaneously, and in this respect is similar to cerebro-spinal-meningitis. When the atmospheric or other influences producing the blood-poison extend over a large area it assumes an "epizoötic" form. When these conditions are limited, and the poisons emanate from purely local surroundings or from the soil, it is called "enzootic," while isolated cases appearing here and there and causing no infection of other animals are termed "sporadic."

The season of the year is supposed to have some influence in its production, it being as a rule more prevalent during the spring and fall months. But it matters not in what form it may appear, or at what season of the year, the principal symptoms and lesions are one and the same in all cases, and are readily recognized by those familiar with them.

It is characterized by an early elevation of temperature, not unusually changing from that of normal to 104 or 107° F., or even higher, within twenty-four hours. The pulse is usually feeble, soft and quick, but not frequent. The animal will have a dejected appearance in the face. There may be an early chill, followed by sudden and marked debility. The head droops, the muscles relax and the animal becomes very weak, sometimes crossing his limbs, or if forced to move will reel or stagger as he walks. There are also elementary symptoms, which in my experience are especially characteristic, namely: tracheal, bronchial, or pulmonary catarrh and continued fever, either of which may predominate, but usually the latter. The animal appears to be suffering from pains in the head (headache), partial deafness from the ringing in the ears, dimness of vision from the swelling of the eyelids and the membrana nictitans, pains in the nasal sinuses from swelling of the mucous membrane lining them. The animal rapidly loses strength without losing flesh.

In some cases early symptoms may be mistaken for spasmodic colic. The horse will paw, kick, get up and down frequently, but gently, not throwing himself down as if really suffering from colic. The symptoms are of short duration, and the animal then soon assumes the upright position, but with drooping head and dejected countenance. A low and debilitating fever (typhoid in character) with external muscular debility very soon follows. The schneiderian membrane, the membrana-nictitans and other visible membranes become greatly injected, presenting a "pinkish red" color, which probably gave rise to the name of "Pink Eye." The eyelids become swollen, sometime to an alarming extent, often being entirely closed. A watery secretion and often pus is discharged from them, and from the nasal passages a catarrhal discharge excoriating in character. The smell is impaired and the throat is sore. The cough when present, as it generally is, is harassing.

Exploration of the chest reveals nothing uncommon, unless pleurisy or pneumonia complicate the case, and when present, they are usually of a "typhoid type," and are not accompanied by some of their marked symptoms; for instance, the severe pain of pleurisy, or the nasty "brick dust" sputum of pneumonia may be entirely absent. Capillary bronchitis may also intervene. These three conditions are not as a rule found in the early stages of the disease, but more often are secondary, following as a sequence rather than being complications.

The digestive organs may also be affected, and diarrhoea be present. If so, and when of not too long duration, it may be beneficial to assist nature in eliminating the poison from the system. The urine is scanty, turbid and heavy with urates, and is voided with some difficulty, which may be due to the fact that the animal finds it difficult to assume the proper position for the act, owing to the weakness and soreness of the muscles.

A horse suffering from influenza seldom if ever lies down, not because of embarrassment to respiration, as in pneumonia or pleuro pneumonia, but because of the general soreness and stiffness of the muscles, and of the extreme debility.

The animal apparently knows that if he gets down he will be unable to rise again. He may become so weakened that he will fall down, but as a rule he will not lie down voluntarily. When he does so, it is a very favorable symptom. Sometimes the disease is complicated by epistaxis and assumes a marked typhoid character, or it may take on a rheumatic or erysipelatous form, or it may assume a dropsical character and terminate in purpura hemorrhagica with œdema of the limbs, abdominal and pectoral regions.

One form of the disease (the pharyngitic) manifests itself locally, with but slight cough and soreness on pressure, yet the animal has great difficulty in swallowing. If water be given him, he will make an effort to drink, but fails to swallow much, if any, the water returning through the nostrils into the bucket. In this respect this disease is similar to cerebro-spinal-meningitis, as we have the same symptom in this disease, but with this difference, that in the latter the animal cannot trough his tongue, owing to the affection of the nerves controlling that organ, and although he may make every effort and plunge his head into the water up to his eyes, he cannot draw in the fluid, and when the bucket is removed it runs out of the mouth instead of through the nostrils, as in the former case. Another peculiarity of this symptom of inability to swallow is that the animal becomes unable to swallow fluids sooner than he does solids, that is, he can continue to swallow solid food after he is unable to swallow water. In my opinion and experience the pharyngitic form of the disease is likely to assume a malignant type, accompanied by a fetid odor, and later on by an offensive discharge and sloughing, resulting in septicæmia and terminating in death, due to the fact that the poison had all been absorbed into the system during the early stages of the attack, and was not subsequently eliminated therefrom by early discharges, as in the catarrhal or other forms of the disease. In severe cases of purpura hemorrhagica with extensive swelling of the limbs and abdominal and pectoral regions, wherein the poisonous material becomes so thoroughly absorbed that it cannot be eliminated, or its action overcome for some length of time, the same condition of sloughing is likely to appear in the swollen parts, when not only the skin, but the intercellular tissue, and even portions of the adjacent muscles become involved in the process of decay. The sloughing goes on rapidly in these cases, until death or the poll-axe puts an end to the suffering of the poor brute. In influenza, in whatever form it may appear, or however much it may be complicated, the marked muscular debility is always present and manifested primarily; while in severe cases of other diseases of the throat, bronchiæ or lungs, after days of sickness from depletive treatment, or from lack of proper nourishment, it may and often does ensue, but is always a secondary symptom and the sequence of other conditions. The course of the disease is, as a rule, regular, convalescence occurring in from seven to fifteen days, and the disease ending, as do nearly all blood diseases, in leaving the patient very much enfeebled and often with swollen limbs, which may remain for some time after the patient has to all appearances otherwise entirely recovered. The natural tendency of influenza is toward recovery. With proper treatment and when uncomplicated, the rate of mortality should not exceed one and a half to three per cent, according to surroundings. Good care, warm quarters (well ventilated) and nourishing food in moderate quantities have much influence on these patients, and when associated with good treatment are generally successful in bringing about a good recovery.

No class or particular breed of horses is exempt from influenza, yet I am of the opinion that the heavier animals, draft horses and others, plethoric and in full flesh, are more susceptible, and seem to become more seriously affected by it. Some authors and practitioners claim that horses owned and kept in the country districts do not appear to be as good subjects as those kept in cities, the former being kept more in accordance with the state of nature. My own experience, however, leads me to doubt this statement. Animals recently brought into our locality from the western sections are generally attacked soon after their arrival, or in course of shipment, hence the term "shipping colds," as used by the dealers. Young animals seem more susceptible than older ones, but the older ones seem to have the disease more severely, and are less able to endure the suffering and weakness consequent upon the attack. When they do take it, it seems to have a more exhausting and enfeebling effect upon them in every way. Many cases that I have seen in old horses were a long time convalescing, and not a few failed to make a complete recovery, being left with some other disease, or dying from the disease itself.

The lesions as seen in post-mortem examinations depend very much upon the local manifestations of the disease during the attack. The heart is usually flaccid, containing fluid blood, or a soft post-mortem clot. Bladder is empty or nearly so, and shows slight inflammatory conditions of the membrane. The urine, if any, is dark colored and turbid and heavy with urates. Kidneys are slightly congested and softened. The intestinal tract is apparently normal, unless typhoid symptoms have been present, when the Peyer's patches will be found to demonstrate that fact. If the catarrhal symptoms were extensive you may find excoriations in the nasal sinuses and air passages with probable sloughing, or perhaps the lesions of a passive pneumonia. Most generally, however, the principal lesions found are those of a bronchitis or catarrh, or both.

Is this Disease Contagious?—Some authors, among them Gamgee, claim that it is; others that it is not. I am inclined to the latter opinion, no positive evidence having proven to me its communicability from one animal to another. Certain it is that it is infectious, but the active principle that produces the poison or carries it from place to place, and from stable to stable, and infects one animal, may also infect ten or even a hundred if they come in contact with the poison; and yet no one diseased animal is capable of reproducing the disease in another when the active principle or poison is absent.

Causation.—Many theories have been advanced as to the cause of this disease. Some claim that it is due to ozone in the atmosphere, others that it is due to a microscopic animalcule; others that it is due to a change of weather, as a sudden change from wet to dry, or from heat to cold; others that it is due to injurious noxious gasses. Various other causes have been assigned, but all in my opinion lack positive proof. Certain it is that whatever may be the cause, whether exciting or predisposing, or both, it is a *material* one, and well worthy of more thorough investigation than the profession have thus far given to it, either scientifically or practically.

A disease so prevalent as this has been for several years past really demands more scientific study. There is no doubt that the conditions of the atmosphere and certain bad surroundings seem to excite a powerful influence on animals when sick, whether they have any effect on the production of the disease or not. This is also true in relation to the season of the year when the attack takes place.

Treatment.—The least meddlesome the better. Perfect rest, good warm stables, warm clothing, warm vegetable and mucilaginous drinks are necessary. Diaphoretics are indicated, but your patient becomes weak so rapidly that they should be given early and carefully. Do not deplete in any way if you can avoid it, as the tendency of the disease is to exhaustion. Good fresh air, without any draft over the patient, is very essential. The general treatment early indicated is stimulative, something to keep up the strength.

The low, debilitating fever is here as an essential part of the disease, and your patient will take no food at all at this stage of the case, and care must be taken therefore to preserve the strength and subdue the fever at the same time. Bleeding is not allowable, because your patient is already becoming enfeebled. You must therefore use febrifuges in connection with stimulants. Spirit. nit. dulc. and opium in strengthening doses are always indicated in all pulmonary diseases, and are very useful in this.

Purgatives are inadmissible. Laxative food is all that is required to keep the bowels regular and in good condition. Give stimulants and tonics—quinine, cinchona, ammonia and alcoholic stimulants. All are indicated and are in the line of good treatment if properly administered. If the rheumatic symptoms of the disease are found give salicylic acid, or salicylate of soda in conjunction with nitrate of potash, carbonate of ammonia, etc. Emulcent drinks made of flaxseed tea, mucilage, licorice root, etc., are sometimes beneficial when the cough is distressing. Any treatment that has a tendency to allay the fever and strengthen the patient is admissible, but good ventilation in the stable, without a draft over the patient, good warm clothing, perfect rest, warm drinks, warm nourishing food and good care are essentials. If symptoms of complications, such as pneumonia, rheumatism, excessive dropsical effusions or swelling of the limbs, or purpura hemorrhagica should arise, you must act accordingly and treat the symptoms as soon as they appear, so as to cut short or abort if possible the condition presented.

As influenza and cerebro-spinal-meningitis usually occur at the same seasons of the year, it is not unlikely that you may have the two in the same stable at the same time, each of which might be at first mistaken for the other. In fact I have seen cases wherein I think I had both diseases at the same time in the same animal. Here you will have to be guided altogether by the temperature. In the former you have it ranging from 104° to 108°F. with great muscular weakness; in the latter you have it from 99° to 102°F., never reaching 104° until near the close of life, unless you have influenza with it.

In influenza you also have the peculiar dragging of the toes of the hind extremities and loss of the power of deglutition from paralysis of the tongue. If both conditions are present you will have a staggering, dragging gait combined with dragging of the toes, and a temperature of 103° to 105°.

This condition would naturally be thought to be very dangerous, but I have not found it positively so. One poison seems to antidote the other; the influenza acting as a safeguard against the dangerous inroads made by the other disease. In cases thus complicated purgatives are indicated and are beneficial in aiding one to eliminate the two poisons from the system quickly. Use stimulative treatment and tonics to build up the system.

After having finished reading the above paper Dr. Miller remarked that he hoped it would be further discussed, as the subject was an important one, and especially at the present time on account of the prevalence of La Grippe in the human family. He has just recovered from an attack of the latter disease, and is satisfied that it is identical with influenza of the horse. Dr. Dustan also remarked that he thought the two diseases identical, and promised a paper on La Grippe of the horse for the next meeting of the Association. Dr. Hawk explained that the outbreak of so-called epizootic of horses, which appeared in this country about twenty-five years ago, differed in some of its features from the influenza of the present time. The last case of old-fashioned epizootic he observed seven or eight years ago. He said that the best treatment was good hygiene and stimulants, that most of the cases died of diarrhoea, and that this is the feature to be guarded against. He differed from Dr. Miller as to the contagious nature of the disease, as he had frequently seen it spread through large stables of horses and thought that it was surely contagious. Dr. Pearson said that there were several diseases that resembled influenza in some of their symptoms, and he thought that some of these, especially contagious pneumonia, were frequently mistaken for influenza. He explained the fact that it does not always spread by saying that nearly all horses contract influenza at some period of their lives, and after recovery are immune, so that when the disease appears in a stable those that have recovered from it do not contract it a second time, and for that reason it does not always spread far. Dr. Hawk agreed with Dr. Pearson as to the immunity conferred by one attack, and thought also that there were several diseases frequently mistaken for influenza.

Dr. Miller opposed these views as to the contagious nature of the disease and expressed the opinion that the cause exists in the stables and that all animals exposed in the stable would contract the disease, while a diseased animal taken to a stable of healthy horses would not carry the disease to his new associates. Drs. Dustan and Lockwood were of the opinion that the disease is contagious. Dr. Baldwin thinks that La Grippe of man and influenza of horses are not the same disease, since they are not communicable from one to the other. Dr. Lockwood explained that influenza was most prevalent

when the prevailing winds were in the east, and that outbreaks rarely occurred when the wind was in the west. Dr. Letts had seen a number of cases that proved to him that the disease spread from horse to horse and he thinks that it is surely contagious. At the close of this discussion the members and visitors adjourned to the dining room to partake of the bountiful feast provided by the Association.

The afternoon session was devoted to a discussion of tuberculosis and the measures that should be adopted to prevent the spread of the disease among the domestic animals, and people of the State. Dr. Leonard Pearson opened the discussion by reading a part of the report of the Tuberculosis Committee of the United States Veterinary Medical Association. He also gave an account of a number of feeding experiments with tuberculosis material and spoke of the use of tuberculin in the diagnosis of the disease in cattle. Dr. Stickler, of Orange, followed with some very interesting and instructing remarks on the disease and gave an alarming report of the number of deaths from tuberculosis in the human family in the State of New Jersey. He urged the necessity of better and more effective legislation. Dr. Baldwin, of New Brunswick, also urged the members to use their influence to secure proper legislation and referred to some cases of tuberculosis that he had seen at the Agricultural Experiment Station near New Brunswick. Dr. Hawk called attention to the lungs of a cow that had been killed on account of having this disease, and spoke of a case that he had investigated thoroughly, in which it seemed very evident that tuberculosis had been conveyed to several children through drinking the milk of a tuberculous cow. Dr. Stickler requested the Association to appoint a committee to confer with a committee from the State Medical Association and other associations for the purpose of formulating a bill to be presented to the next Legislature having for its object the eradication of the disease from the dairy herds known to be infected and to prevent the sale of milk from such herds. The Association also adopted resolutions of condolence with the family of the Hon. J. M. Rusk, deceased, late Secretary of Agriculture, who was an honorary member of the Association. Resolutions were also passed approving the action of the late International Veterinary Congress held in Chicago and of the resolution adopted there relating to the Spoils System in the Veterinary appointments

recently made by the Bureau of Animal Industry. A resolution was also passed disapproving the action of the officers of the National College at Washington, in making their course one of two years instead of a more lengthy one, and expressing the belief that such action was prejudicial to the best interests of Veterinary Science. Drs. Dustan, Letts and Drummond were appointed essayists for the next regular annual meeting to be held in Trenton, the second Thursday in April, 1894.

Some interesting cases were then reported by some of the members and a vote of thanks was extended to the visitors and others for their attendance and remarks, also to Mr. Voorhees for the use of the elegant parlors of the United States Hotel, after which the meeting adjourned.

S. Lockwood,
Secretary.

PLEURO-PNEUMONIA.

The Subject of an Interesting Discussion by the Montreal Veterinary Medical Association.

A meeting of the Montreal Veterinary Medical Association was held in the lecture room of the Veterinary College, 6 Union avenue, Thursday evening, the honorable president occupying the chair.

After the reading of the minutes of the previous meeting and transaction of regular business, Mr. J. R. Hollingsworth read an essay on "The External Parasites of the Horse," describing the different species of the various parasites, vegetable and animal, their mode of living under their varying circumstances, their manner of propagation, tenacity of life, and their effects on the animal system, producing many forms of disease, external and internal, which in many cases are contagious to man and beast.

Professor D. McEachran stated that the chief difficulty in treating contagious diseases produced by these parasites was due largely to lack of attention and proper regard for cleanliness of surroundings. He gave treatment in detail by which these troublesome diseases might be eradicated.

The next essayist, Mr. J. McLeod, presented an elaborate paper on "Pleuro-pneumonia Contagiosa in Cattle." First he discussed the early history of this highly contagious disease in the bovine species, it appearing as early as 350 years B. C. He referred to the various outbreaks occurring within the past 180 years in Great Britain and the United States, the enormous loss of stock and capital invested, and the great expense to the different countries in trying to suppress these epidemics. The origin of this disease is not definitely known. The period of incubation is indefinite, and the diagnosis not always certain. The symptoms were described minutely and the general appearances and course of the disease, showing variations that take place in the various stages as observed by methods

at the disposal of the veterinary practitioner. He also gave an account of rules and regulations of quarantine as adopted and rigidly enforced in this country and others, and theories in regard to the commencement of disease and epidemics resulting therefrom. The general appearance, as shown by post-mortem examination, was outlined and pathological appearances minutely described. He also dwelt on the total unfitness of cattle suffering from this disease for consumption as food. Methods of prevention by inoculation and methods for applying the different remedies were mentioned.

The subject being so important and extensive, it was decided to call a special meeting on Monday evening. The chair was occupied by Professor D. McEachran, and subsequently vacated in favor of the president, Professor Adami. The meeting was then open to members for discussion on the above subject.

Professor McEachran in his opening remarks stated that the subject was a most important one to the veterinary practitioner in Canada to-day, on account of the embargo placed by England on our cattle, owing to errors in judgment of officials of the Imperial Government. He suggested the appointment of a Bacteriologist in England for the purpose of investigating bovine lung diseases, with a view to the discovering by pathological and bacteriological investigations reliable means of arriving at correct diagnosis. The recently reported cases of pleuro-pneumonia contagiosa in England in cattle shipped from Canada to that country have been investigated here, and no signs of this disease have been discovered. Portions of the lungs of two recently suspected animals have been examined microscopically by Professor McEachran and Professor Adami, their opinion being that it was not pleuro-pneumonia contagiosa.

The president addressed the meeting, stating that there was considerable uncertainty in dealing with pleuro-pneumonia contagiosa, and great care should be observed in diagnosing, especially for governments, thus saving trouble and expense. He advised slaughter of one animal suspected to arrive at a certainty. Professor Adami then described minutely the appearances of the tissues and organs as presented on post-mortem examinations, describing the changes that had taken place as produced by the disease, also variations in color, size and markings, of lung tissue, etc., and the effect of diseases allied to it and their different changes as compared with this particular form of pneumonia.

Specimens were shown of genuine English pleuro-pneumonia and compared with sections of what the British Veterinary Inspectors call Canadian lung, but which Professor McEachran states would be more appropriately named transient pneumonia, as no such disease exists in Canada, and is only seen in animals traveling by railroads or an ocean journey.

After a prolonged and interesting discussion by the members, the meeting finally adjourned for two weeks.—Montreal *Gazette*, December 15, 1893.

INDIANA ASSOCIATION OF VETERINARY GRADUATES.

The Annual Meeting of the Indiana Association of Veterinary Graduates was held at Ft. Wayne, December 6 and 7, 1893, in the parlors of the Wayne Hotel.

The President, Dr. C. F. Bell, being absent, Dr. J. H. Honan was appointed chairman pro tem. After the roll call the minutes were read and approved. There being but a few members present, it was decided to waive the rules and proceed to the admission of new members.

Drs. D. E. Stauffer, of North Manchester; J. W. Cook, of Soshen; Walter Langtry, F. W. Myers, Ft. Wayne; D. Fitch, and William Mabee, of Warsaw, were admitted to membership. The written applications of Dr. George W. O'Leary, of Huntingdon, and Dr. J. L. Smith, of South Bend, were favorably acted upon.

The Secretary, Dr. J. E. Cloud, then read a very interesting account of the growth of the Association during the past eighteen months, showing the increase of membership to be very encouraging. The Society then tendered the secretary a vote of thanks for the very efficient manner in which he had performed the arduous duties of his office. Dr. Stull then read a paper of Dr. Bell on "State Veterinary Legislation," which was followed by a very animated discussion. The paper was ably written and showed that the author had given the subject much thought, and all regretted that he could not be present in person to bring out some points more clearly.

Adjourned till 7.30 p. m.

Upon reconvening, the chair called upon G. W. Vernon, M. D., Secretary of the Indiana Veterinary College, to present to the Society his report concerning the college, which he did in a very fair and unbiased manner, stating that he had no reason for finding fault with the action of the Association at their July meeting in passing the resolution condemning the Indiana Veterinary College. He said he hoped the mistakes made in 1892 would not prejudice the Association in dealing with the college as re-organized in 1893. This re-organization consisted in substituting a two years' course of six months each, requiring a more thorough entrance examination, and strengthening the corps of instructors.

After assuring the Society that it was his intention, and the intention of all interested, to raise the college to the standard of competing institutions in its immediate vicinity, he was asked to retire that the Association might have unhampered freedom to discuss the subject. The Society finally decided to lay the matter on the table for consideration at the semi annual meeting in July.

The election of officers followed.

The chair in calling for nominations for president, brought to his feet Dr. Stull, who in a few well chosen words nominated Dr. J. E. Cloud, of Richmond. Dr. Cloud was elected by acclamation. For vice-president, Dr. Stull of South Bend, was elected without a dissenting voice. For secretary, Dr. J. H. Honan, and for treasurer, Dr. F. A. Balser were elected. The chair appointed as a Board of Censors, Dr. Wallace, of Marion, Dr. Langtry, of Fort Wayne, and Dr. Stauffer, of North Manchester; as a Committee on Arrangements, Drs. Meyer, Mabee and Hitch; as Legislative Committee, Drs. Balser, Bell and Stull; as a Committee on Program, Drs. Donan, Chamberlain and Pote.

The meeting then adjourned to meet Thursday morning at 8 o'clock.

On convening Thursday morning, miscellaneous business was first taken up. The Chair then called on Dr. Chamberlain to read Dr. O. L. Boor's paper on Tuberculosis. This paper dwelt particularly on the communicability of tuberculosis from cattle to man, and showed the writer to be thoroughly conversant with the

subject. The very spirited discussion that followed the reading of this paper evinced the interest of veterinarians in the disease that is now eliciting the attention of pathologists in all parts of the civilized world. Following this was a paper on Actinomycosis, which was well received. The Legislative Committee was ordered to draft a bill on veterinary legislation to be presented at the next meeting. This subject of veterinary legislation is very important, and as it will be thoroughly discussed at the next meeting, every qualified veterinarian in the State should be present.

The Society then adjourned to meet in July, at Indianapolis.

J. E. CLOUD, *President.*
J. H. HONAN, *Secretary.*

VETERINARY NEWS.

DR. W. B. E. MILLER, of Camden, N. J., has just emerged from the sick room after a serious illness of a bronchial type.

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PHILADELPHIA has a warm admirer and strong supporter of the Veterinary profession in Director of Public Safety A. M. Beitler.

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TENNESSEE'S State Board of Health Bulletin contains an interesting and commendable report of the recent Veterinary Congress by delegate Dr. W. C. Rayen.

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PHILADELPHIA steps to the front with a newly constructed veterinary hospital for her sick and injured department horses. All the stalls are fitted with automatic watering troughs.

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THE old Burghers of Hoboken have awakened from their Rip Van Winkle slumber, and declare that the City Veterinarian, with a salary of $700 for professional attendance upon fifteen horses, must go.

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PENNSYLVANIA should again take up the milk bill defeated at the last session of our Legislature. The public are now better informed as to the selfish motives and lack of knowledge of those who were most opposed to the bill and contributed to its defeat.

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IT is reported that Maine and New Hampshire have quarantine restrictions against the cattle from Massachusetts, on account of the supposed extreme prevalence of tuberculosis among the cattle in the last-mentioned State.

It is doubtful if much difference in this respect exists between the New England States.

THE veterinary profession as represented in the various organizations of this country stands ready, willing and eager to aid Secretary Morton in his desire to place veterinary appointments on the merit system, and to retain efficient and capable men in a service, which adds so much to the general advancement of veterinary science.

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"GOOD GOVERNMENT," published at Washington, in commenting upon the resolutions adopted at the late Veterinary Congress condemnatory of the "Spoils System" in veterinary appointments, reports Secretary Morton as being very much distressed at the way he has been imposed upon by the politicians in securing appointments in the Bureau of Animal Industry.

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"STATE VETERINARIAN GRESSWELL returned yesterday from Kansas City, where he has been attending the conference of the veterinary and sanitary boards of the Central States, interested in the northward movement of southern cattle.

Dr. Gresswell says that satisfactory arrangements were arrived at, whereby it is almost certain that a uniformity of inspection will be made in 1894 between the States interested in the matter, particularly in the local group, comprising Montana, Wyoming, Colorado and North and South Dakota.

A resolution was also passed embodying a recommendation to the Department of Agriculture for a slight alteration in the fever line in Texas. The proposed change will be slightly farther east in the northern counties, and farther west in the southern counties."—Denver, Col., *Times*, Nov. 21, 1893.

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AN ACT to fix the pay, allowances and rank of the veterinarians of the United States Army.

Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled:

SECTION I. That the pay of the United States Army Veterinarians shall be one hundred and twenty-five dollars ($125) per month, with the allowances, pensions, retirement, tenure of office and relative rank of a Second Lieutenant of Cavalry. *Provided*, however, that hereafter candidates for the United

States Army Veterinary service shall comply with all the preliminaries now required from candidates for "The Army Medical Corps," and shall pass such examinations as the Secretary of War may direct.

SECTION II. This Act shall be in force and effect from and after its approval.

SECTION III. All Acts inconsistent with this Act are hereby repealed.

Endorsed and recommended by Gen. Schofield and the War Department.

Introduced in the Senate by Mr. Cameron.

Introduced in the House by Mr. Robinson.

This is the Act that the United States Medical Association favors.

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ALL veterinarians must have been pleased when they read the following extract from the President's message to Congress:

"I join the Secretary (of Agriculture) in recommending that hereafter each applicant for the position of inspector or assistant inspector in the Bureau of Animal Industry, be required, as a condition precedent to his appointment, to exhibit to the United States Civil Service Commission his diploma from an established, regular and reputable veterinary college, and that this be supplemented by such an examination in veterinary science as the Commission may prescribe."

If these recommendations are carried into effect, they will have a great influence on veterinary education in this country, and will hasten the coming of the new era. The message also contained the following paragraph:

"While contagious pleuro-pneumonia in cattle has been eradicated, animal tuberculosis, a disease widespread and more dangerous to human life than pleuro-pneumonia, is still prevalent. Investigations have been made during the past year as to the means of its communication and the method of its correct diagnosis. Much progress has been made in this direction by the studies of the Division of Animal Pathology, but work ought to be extended, in co-operation with local authorities, until the danger to human life arising from this cause is reduced to a minimum."

THE following is a list of the officers of the United States Veterinary Medical Association, and the committees so far as they have been appointed :

OFFICERS—1893–94.

President—W. Horace Hoskins, 3452–54 Ludlow st., Philadelphia, Pa.

Vice-President—A. W. Clement, 902 Cathedral st., Baltimore, Md.

Secretary—T. J. Turner, Columbia, Mo.

Treasurer—James L. Robertson, 409 Ninth ave., New York City.

COMMITTEES.

Comitia Minora.

A. Liautard, Chairman, 141 West Fifty-fourth st., New York City.
W. L. Williams, Bozeman, Montana.
R. S. Huidekoper, 155 West Fifty-sixth st., New York City.
T. B. Rayner, Chestnut Hill, Philadelphia, Pa.
A. H. Baker, 145 Michigan ave., Chicago, Ill.
F. H. Osgood, 50 Village st., Boston, Mass.
J. F. Winchester, Lawrence, Mass.

Finance.

Wm. Dougherty, Chairman, 1035 Cathedral st., Baltimore, Md.
S. S. Baker, 901 Jackson Boulevard, Chicago, Ill.
R. A. McLean, 14 and 16 Nevins st., Brooklyn, N. Y.

Diseases.

Leonard Pearson, Chairman, 2200 Pine st., Philadelphia, Pa.
S. E. Weber, Lancaster, Pa.
N. S. Mayo, Manhattan, Kan.

ARMY LEGISLATION.

—— ——, Chairman, —— ——.
G. E. Griffin, Fort McIntosh, Laredo County, Texas.

Special Committees.

On Incorporation.

C. P. Lyman, Chairman, 50 Village st., Boston, Mass.
Wm. Dougherty, 1035 Cathedral st., Baltimore, Md.
D. J. Dixon, 366 Washington st., Hoboken, N. J.

On Congress of Colleges.

W. Horace Hoskins, Chairman, 3452–54 Ludlow st., Philadelphia, Pa,
A. W. Clement, 902 Cathedral st., Baltimore, Md.
Jno. W. Gadsden, 128 N. Tenth st., Philadelphia, Pa.

Nomenclature of Swine Plague.

A. W. Clement, Chairman, 902 Cathedral st., Baltimore, Md.
Theobald Smith, 1804 Columbia Road, Washington, D. C.

Revision of Constitution and By-Laws.

—— —— Chairman, —— ——.
Leonard Pearson, 2200 Pine st., Philadelphia, Pa.

The committees on "Intelligence and Education," "Prizes," and "Publication" have not yet been announced.

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The committee of the United States Veterinary Medical Association on the Congress of Colleges met in Philadelphia, December 30, 1893. It was decided to call the congress at the close of the present college session.

On account of serious illness, Dr. Jno. W. Gadsden was unable to meet with the other members of the committee.

OBITUARY.

Dr. William T. Carmody, of New York, one of the most prominent veterinarians in that city, died at his home, No. 60 West Thirty-seventh street, November 21, from pneumonia, after a week's illness. He was born in London, England, on December 7, 1851, and was educated at Donai College, Donai, France, and the Royal Veterinary College of London. He came to New York fourteen years ago and built up a large practice. Dr. Carmody was one of the veterinarians at the late Horse Show in Madison Square Garden, New York, and it is said that he contracted cold while examining the horses at the show. He was a man of a very genial temperament, always cheerful, and much esteemed and respected by his associates. He was a member of a number of Orders and Lodges, some of which took charge of the funeral arrangements. A wife and two small children are left. His death is greatly lamented by all of his colleagues in New York City and by his numerous friends throughout the Eastern States.

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PREVENTION OF TUBERCULOSIS.

BY DR. JOHN M. PARKER.[1]

Believing that the State Veterinary Association ought to lead in formulating laws for the attempted prevention of tuberculosis, I have endeavored, in a rough way, to bring the matter before the Association, so that, if thought advisable, some action might be taken on the matter.

At the present time, prophylactic measures for the purpose of controlling and checking the spread of tuberculosis are attracting a great deal of attention, not only from the veterinary profession, but medical associations and State boards of health throughout the country are taking the matter up, and in several States the health officials have placed tuberculosis on the list of contagious diseases, and otherwise have taken decided action on the matter.

Michigan was the first to adopt this line of action, and on September 30, 1893, "The Michigan State Board of Health unanimously decided that consumption is a dangerous, communicable disease and must be reported by physicians and householders to the several boards of health." (*Medical Record*, November 18, 1893.)

Pennsylvania next came into line, and in October the "Philadelphia County Medical Society" appealed to the Board of Health of Philadelphia to place tuberculosis upon the list of contagious diseases to be reported to the board.

[1] Read before Massachusetts Veterinary Association, January, 1894.

The Health Department of the State of New York, acting on the advice of Dr. H. M. Biggs, the bacteriologist of the department, has taken a similar position. (See p. 832 *Medical Record*, December 23, 1893.)

While at Chicago the American Public Health Association, in conjunction with the International Congress of Public Health, adopted the following practical recommendations for the prevention of disease :

1. The notification and registration by health authorities of all cases of tuberculosis which have arrived at the infectious stage.

2. The thorough disinfection of all houses in which tuberculosis has occurred, and the recording of such action in an open record.

3. The establishment of special hospitals for the prevention of tuberculosis.

4. The organization of societies for the prevention of tuberculosis.

5. Government inspection of dairies and slaughter-houses, and the extermination of tuberculosis among dairy cattle.

6. Appropriate legislation against spitting into places where the sputum is liable to infect others, and against the sale or donation of objects which have been in use by consumptives, unless they have been thoroughly disinfected.

7. Compulsory disinfection of hotel rooms, sleeping car berths and steamer cabins which have been occupied by consumptives before other persons are allowed to occupy them.

The reports and recommendations of the committee were adopted.

Massachusetts ought not to be far in the rear, and to give credit where it is due, I believe at least one of the local inspectors in Massachusetts has advised the health officers of his locality to place tuberculosis on the list of contagious diseases (I refer to a report by Dr. Winchester, of Lawrence, to the local Board of Health).

In Massachusetts the cattle commissioners are an independent commission, having no connection with the Board of Health, and so far there has been no adequate legislation sufficient to check the spread of tuberculosis among our dairy stock. The same applies, though in less degree, to the action taken by the State of New York, for it is not enough to isolate and destroy

infected cattle, *such action alone does not strike at the root of the matter. Hitherto the influence exerted by the conditions and surroundings under which the animals are kept has been almost entirely overlooked.*

Seed always requires proper soil before it will develop. The bacilli require a suitable culture media, and we know that tubercle bacillus is one of the most exacting in this respect.

It is not sufficient that the bacilli should be inhaled, we know that all animal bodies in a healthy condition have a great disease-resisting power and it requires more than the mere presence of the bacteria to cause the disease. In other words, the bacteria are only a small part of the disease. As a contributor to the *Medical Record* (September 2, 1893), truly says: "There are other factors equally as important in the causation of the malady as the part played by the microbe."

In the report of the Congress for the Study of Tuberculosis, held in Paris in 1891, it is said: "If there is one thing above all others that is learned from the many discussions upon this well-worn but still obscure subject of tuberculosis, it is that the bacilli alone do not cause the disease. The host is obviously not the least important element."

We must all acknowledge that there is in the constitution of the individual, before bacilliary infection takes place, something that determines the fact of infection and that largely determines the course and character of the results of infection. Parasites thrive only under certain conditions. Remove the conditions which are favorable for their propagation and they disappear. "You take away their lives when you take away the means by which they live," has been well said. In other words, build up the health and constitution of the animal body, increase the disease-resisting powers and you are taking a long step in the right direction. On the other hand, pay no attention to the general health of the animal, allow its general health to run down, weaken its constitution by breeding young and breeding continuously, force the milk supply and continue milking while the cow is in calf, feed high and give little exercise, keep in a close, hot barn in unsanitary surroundings and you produce an animal that is just in the right condition to contract disease, yet these are exactly the conditions usually found in the average dairy farm.

Breeders and farmers pay little or no attention to the general health and constitution of their dairy stock. They seem to consider excessive milking qualities to be the sole aim and purpose of breeding. I had a good illustration of this the other day. My attention was called to a heifer fourteen months old. It was strong and rugged for its age. The owner asked me what I thought of breeding her when she came in heat; a farmer standing near by remarked that it was the best thing he could do. I asked him why. He said because she would become a better milker. That, I believe, is a fair sample of the way farmers look on the matter. *He would have her a big milker at whatever cost to her strength and constitution.*

Again, what is to be said about the practice of continuing to milk a cow while carrying a calf. Through use and wont it has become the invariable practice, at the same time I believe it to be one of the most serious of the many serious conditions that tend to sap the strength and vitality of our dairy cattle.

Probably you are aware what the result would be if a woman were to nurse a child while pregnant, yet not only is this invariably done in dairy cows, but the milking qualities are forced to the utmost limit, and if she gets a month's rest before calving she is in luck. On top of this, in-breeding is commonly practiced, and a cow is expected to bear a calf with unfailing regularity year after year, and if unable to do so, she is thrown aside as worthless.

Nor is this all—all of you are familiar with the hot, foul air, reeking with the smell of the cattle, that will meet you when the barn door is opened in the morning. The cows in many cases are packed in, every crevice and opening through which the air may gain admittance is blocked up, and they are kept in these conditions during the entire winter with little or no exercise. You have here just the conditions that are most suited for the development of the disease.

Introduce a consumptive cow into a herd kept in this way. The cow has a cough possibly, or more or less of a discharge. The discharge comes in contact with the woodwork. This dries up, particles fall off and mix with the hay and dust and chaff. The barn is close and stuffy, the animals close together, there is no fresh air to carry away the poison-laden atmosphere. They breathe the same air over and over again, *with their noses in the most dangerous place, close to the ground, where the dust and*

dirt accumulate. What wonder if the whole herd, or a large percentage of them, become diseased in a short space of time.

And it is not only in the ventilation. What about the manure heaps? What about the slime and filth so often heaped up in the cellar below? What about the water supply? The cattle often get their water supply from what is practically little better than a cesspool.

Are these animals living in healthy surroundings? Is it common sense to expect them to be strong and healthy, and free from disease?

To counteract this state of affairs, the Cattle Commissioners have been in the habit of taking *only* the pronounced cases and destroying them, and leaving animals that are predisposed to disease, animals that are weak constitutionally, not to mention those infected animals that they have failed to discover, and leaving them right in the midst of infected surroundings. The result is what one would naturally expect: little or no progress has been made in eradicating the disease, and if no change is made in the system at present in use, their work might be continued indefinitely without any practical result.

Instead of being in the hands of an independent board, the supervision of the matter should be in the hands of the State Board of Health. Of course it is not possible for any great change to be made at a jump, but it is possible for a system of education to be begun at once, always keeping in view the ultimate adoption of a more perfect system of State supervision and inspection of dairy farms.

Any proper system of inspection should embody the following points:

I. The whole matter should be transferred to the State Board of Health. The Board of Agriculture shall be expected to co-operate by spreading information on the subject among farmers and stock-raisers by means of lectures and pamphlets, as has been done in Pennsylvania and other States.

II. The State should be divided into districts. Each district to be in the charge of a competent veterinary surgeon as inspector, who shall be responsible only to the Chief State Inspector.

III. One or more quarantine stations shall be established in each district, so that suspicious cases, or cases to be kept in

quarantine may be sent there to be kept or killed, as is thought fit.

IV. Owners of cattle killed shall be compensated by the State.

V. No person shall be allowed to sell milk without a license, the license to be granted by the State, after a satisfactory examination of the dairy and herd by the inspector in the district.

The inspector's duties shall embrace the following points:

1. He shall make periodical visits to all the licensed dairies in his district.

2. He shall condemn all tuberculous cattle, suspicious cases shall be tested with tuberculin, and if it is thought proper, it shall be sent to the quarantine station of the district to be killed or otherwise as thought fit. The owner may have the privilege of keeping suspicious cases, under certain restrictions, on his premises for the purpose of turning into beef, if he so desire. After the removal of a tuberculous animal, the inspector shall see that the box or stall is thoroughly disinfected.

3. He shall condemn as unfit for dairy purposes all animals in an unthrifty or sickly condition.

4. He shall not grant licenses to dairies in a dirty or unsanitary condition. In this connection the following points should be noticed:

(*a*) The barns must have a minimum of at least 600 cubic feet for each animal; no height of over fifteen feet to be included. (The cubic capacity to be greater if thought advisable.)

(*b*) They must have sufficient ventilation to the reasonable satisfaction of the inspector.

(*c*) The barn must be light to the reasonable satisfaction of the inspector.

(*d*) The floor of the barn must be tight, so that the urine will not soak through and drip onto the ground or into the cellar below.

(*e*) The manure shall not be allowed to lie in piles against the barn walls, but shall be a suitable distance from the farm buildings.

(*f*) The water shall be of good quality, and shall not be taken from wells in or near the barnyard, nor from wells so situated as to allow the surdrainage to flow into it.

Of course, as before remarked, it would be impossible to enforce all these requirements throughout the State at short notice, but the spirit of the instructions could be carried out, and gradual changes made, the boards of health and the inspectors always keeping in view the ultimate end to be attained.

In other States the boards of health have gone to work in a business-like way, in attempting to control tuberculosis in the human being, why cannot the State of Massachusetts do the same with her dairy cattle? I believe the time has come when something definite should be done. No better time could be chosen than the present, and with this end in view, I move "that a committee be appointed to report to this association on the matter, so that the association will be able to communicate with the State Medical Society and the State Board of Health, inviting their presence and assistance in discussing intelligently the best method of controlling and checking the spread of Bovine Tuberculosis."

AZOTURIA.

By Daniel D. Lee, Veterinarian,
Boston Veterinary Hospital.

It has been my fortune for the last two years to see many cases of azoturia at our hospital, and although I have no new suggestions to make in regard to the pathology of the disease, still I think my experience in regard to the diagnosis, treatment and prognosis may be of interest.

The disease seems to me to be caused by some toxic element formed in the blood from *over nutrition*, or in rarer cases from some form of *indigestion*. It may be due to a ptomaine.

This poison, whatever it may be, entering the blood poisons the *nervous system* and causes the red corpuscles of the blood to be *disintegrated*, in which condition they are in the nature of a foreign constituent in the blood, and as such are excreted by the kidneys, which are excited to increased action both by the excitement of the nervous system and the irritating and foreign, or rather altered, constituents of the blood.

The urine is turned black, or very dark brown, by the *hæmatin* (acted on by ammonia) extracted from the red corpuscles, and this is highly albuminous, the sediment contains disintegrated blood corpuscles, but owing to the large amount of amorphous phosphates always present in horses' urine, the examination of the sediment is not very satisfactory.

I am sure that the kidneys themselves are not the cause of the disease ; they are simply overworked in trying to rid the system of the poison

Azoturia principally affects the heavier class of draft horses, but rarely we see it in horses of 1000 pounds or less.

The history is always that the animal has worked for a year or two (I do not recall ever having seen a case in a green horse), that for a day or two the horse has not worked, and *nearly always* has got the regular heavy feed, which the system did not need to support it while the horse was idle, this produces a derangement of the digestion and so the poison, which enters the blood causes the peculiar symptoms.

Yet I have seen cases in horses that had worked *every day*, in those that I know were fed very low and even in small driving horses.

This class of cases, which cannot be traced to the classical causes, I attribute to digestive derangements, from unknown causes which produce the same poison.

Symptoms.—The horse feels very fresh, drives well for a longer or shorter distance—usually one or two miles, although I have known horses to go ten or fifteen miles before being taken, then signs of uneasiness come on, profuse sweating, lameness in one or both hind legs, with cramps.

If the horse is stopped at once, heavily blanketed and not made to walk any further, the chances are good, but if the horse is driven till he falls and then got up to be urged on again and again, the result is almost sure to be fatal.

If kept quiet and warm in nearest barn or moved in an ambulance when first taken, provided the horse has not worked more than two or three miles, the chances are better for recovery.

Treatment.—Supposing that the case is well advanced with knuckling of the fetlocks and inability to extend the digit so as to rest the hoof flat on the ground.

Get the horse into some barn where there is space for him to thrash around; bed down well with straw, shavings or tan bark; if he tries to stand use slings, but take them off *at once* if they excite the horse.

Right here I will state that I think I never knew a horse to get well unless he got up *without assistance* inside of an hour after being taken; he may go down again in a minute, but the ability to extend the digits, even for a minute or two, allowing the hoof to rest flat, or nearly so, on the ground, always seems a good symptom.

The practice of keeping a horse on his feet with a whip will invariably kill a case which, if treated rationally, would get well. The same may be said of the use of slings; take them off at once if they excite the horse.

For medicinal treatment give an aloe ball of 7½3, and follow with a quart of oil.

Have the animal heavily blanketed, and turned over every hour if unable to do so without help itself.

By pressing on the bladder per rectum or by use of catheter draw the urine, more for diagnosis than to aid the horse, as nearly every case can pass urine, and the drawing of it makes the symptoms much worse for a time from the excitement.

A heavy leather or canvas hood should be put on the head to protect it from bruising, and the shoes taken off with great care, as terrible blows are struck when the animal struggles.

Many horses take things calmly and can sit up on the sternum unaided, and these should be tried in slings once in every twenty-four hours; if no signs of improvement are seen in three days, it is as well to shoot them.

In a wild, furious horse, follow the outlined treatment, make no attempt to confine him in a box stall, but give plenty of room on the floor, and give ounce doses of chloral in pint of water to quiet.

I have seen convalescent cases driven into a frenzy of terror on being led into a stall, at once quieted by letting them go into a larger space.

In one hospital we have a great space laid down in tan in which the azoturia cases are laid from the ambulance, and I have seen horses in slings in a stall, in a frenzy of excitement, at once quiet down when dropped in the slings and allowed to struggle in the tan unmolested for a few minutes. They often

get up alone and walk around a few steps in a short time. Don't feed for twenty-four hours. Give plenty of water as often as they want it.

Prognosis.—If the horse can get up alone, or is standing, favorable—if quiet and soothing treatment without unnecessary excitement—if the distance traveled is short before they are seized so much the more favorable. If in three days a horse can not stand, either unassisted or in slings, shoot the animal.

A much feared after result is the atrophy of the anterior femoral muscle; this often renders useless or ruins for a year a fine horse, or makes it necessary to shoot.

Once or twice I have seen cases go into septic pneumonia after getting on their feet.

As Dr. Burkett and myself have many more than our share of these cases, from the fact that they are sent to our hospital in our ambulance, often three or four a day, after a long holiday or stretch of bad weather, I should be glad to send portions of the animals that die to any one wishing to make investigation in this disease, which in large cities annually kills off many of the finest draft horses.

THE CASTRATION OF CRYPTORCHIDS.

By P. J. Cadiot,
Professor in the Veterinary School at Alfort.[1]

With eleven illustrations.

[Translated from the German[2] by Dr. John W. Adams.]

CRYPTORCHIDISM IN THE HORSE.

At an advanced period of fœtal life the testicle moves from its primitive position under the lumbar vertebræ and near the kidneys toward the inferior abdominal wall, arrives at and passes the superior inguinal ring, traverses the inguinal canal and the inferior ring, and appears in the scrotal sac, usually

[1] De la castration du cheval cryptorchide. Par P. J. Cadiot, Professor à l'école vétérinaire d'Alfort. Avec 11 figures dans le texte. Paris, Asselin et Houzeau. 1893.

[2] Monatshefte für praktische Thierheilkunde. IV. Band. 9. Heft. Aus dem Französischen übersetzt von Professor Dr. Fröhner in Berlin.

by the end of the sixth month after birth. This is the regular course of development. In certain individuals, however, the testicle tarries at definite points in the previously described course; it is then detained either in the abdominal cavity or in the inguinal canal. The condition which results from this incomplete migration of the testicle has been named cryptorchidism.

The frequency of appearance of this anomaly varies in the different races of the horse. It is much more frequent in northern countries, as Denmark, Holland, Belgium and England, than in France, but is seldom seen in Germany, Italy, Russia and in the Orient, according to the writers of these countries.

We distinguish several kinds of cryptorchids: an *abdominal*, when the testicle is in the abdominal cavity; an *inguinal*, when it has passed through the abdominal wall and wedged itself in the upper portion of the inguinal canal between the small or internal oblique muscle and the inner surface of the thigh; a *simple*, when only one testicle occupies an abnormal position (monorchidism); a *double*, when both testicles are abnormally situated (cryptorchidism in the proper sense); and finally, it may be abdominal on one side, and inguinal on the other. The remaining varieties are devoid of special interest to the surgeon.

Horses, which are afflicted with this abnormality are called cryptorchids, monorchids or ridglings. In Germany, the term *false ridgling* (falsche Spitzhengste) is applied to those horses in which the testicle rests within the inguinal canal.

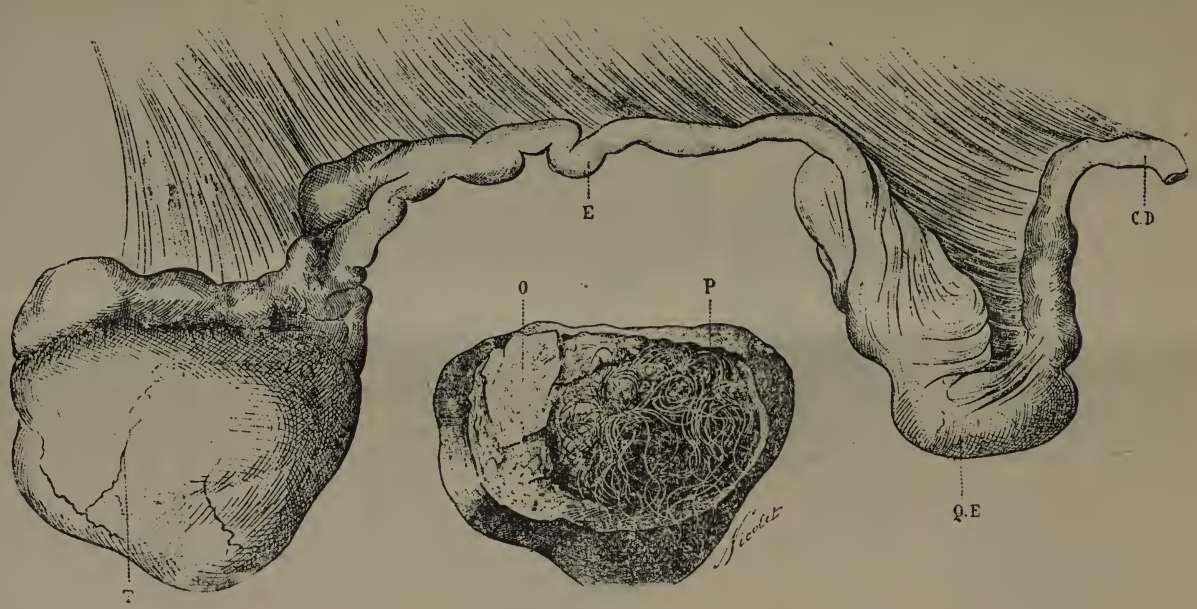
As to the *causes* of cryptorchidism there are several opinions. Some, as, for example, Wilson, attribute the cause to the disproportion between the size of the testicle and the dimensions of the canal through which it must pass, or to a transverse position of the upper inguinal ring. Others advance the opinion that the driving power, upon which the change of position of the testicle is dependent, is too weak. Follin and Goubaux have suggested a weakened condition of the cremaster. This small muscle, however, cannot of itself alone be the cause of the migration of the testicle. Embryology has shown that the real cause of this migration is to be found in the action of Hunter's guiding band, the gubernaculum testis. This guiding band consists of a mixture of connective tissue and

muscular fibre (cremaster) and passes from the bottom of the testicular sac to the posterior end of the testicle and epididymis. At the point where it leaves the abdominal cavity the free surface of the peritoneum shows a shallow depression (processus vaginalis of Franck). The gubernaculum testis exercises either alone or in conjunction with the cremaster a gentle, but continuous and gradually increasing traction upon the testicle and draws it through the inguinal canal and into the testicular sac. Should it be too weak, however, from a scarcity of contractile tissue, or an entire absence of muscle fibres, the testicle will become permanently lodged at one of a number of places, either in the abdominal cavity or in the inguinal canal. Only exceptionally is cryptorchidism dependent upon an abnormal shortness of the serous fold that suspends the testicle from the sublumbar region.

Monorchidism does not appear to be left and right with equal frequency. Hering and Franck, from a limited statistical research, have believed it to appear on the right side oftener than on the left, while later, Goubaux, Diericx and Degive, observed the reverse. Stockfleth and Mauri found an almost equal number of both cases. I have myself among fifteen cases found ten left; Trasbot among twelve, found nine left; Degive among thirty-seven, found thirty-four left, and Donald among forty-six, found forty-five left.

The consequences of an abnormal position of the testicle are in all cases practically the same. The testicle ceases to develop and retains its fœtal characteristics; it is small, flaccid, soft, consisting of grayish or light reddish tissue without spermatozoa, and has an average weight of from ⅔ to 1½ ounces. The weight of the normal testicle of a healthy animal, on the other hand, varies between two and five ounces. In abdominal cryptorchids, the testicle is egg-shaped or flattened, fig-like, and prolonged posteriorly by the epididymis, which is drawn out so as to resemble a loop having numerous convolutions and a tail from four to six inches in length (Fig. 1); sometimes its surface is marked by venous branches, or covered by small growths. It may manifest fatty degeneration. Frequently it is rudimentary, atrophic, of the size of a bean or pea, and consequently difficult to find ("Haricocele"). Sometimes, however, it is of normal size. In common with all glands having an abnormal position, the misplaced testicle tends to undergo

FIG. 1.

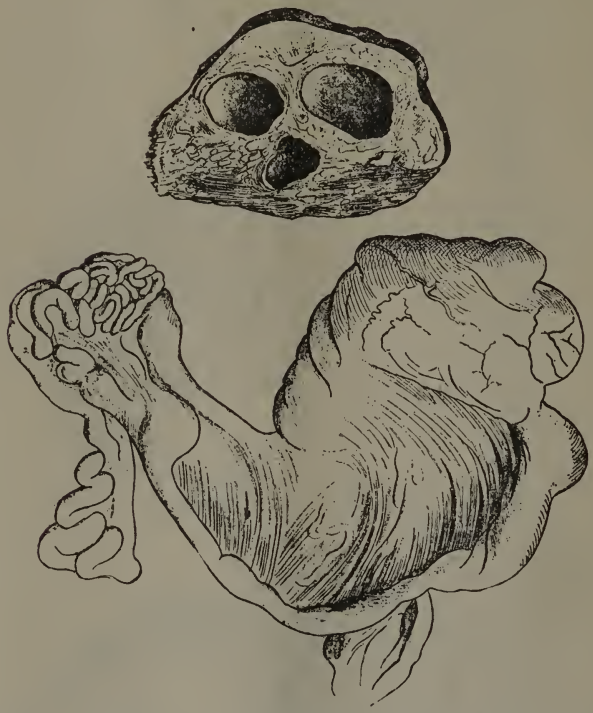


Testicle with large Dermoid Cyst.

T Testicle. *E* Epididymis. *QE* Tail of the Epididymis, or globus minor. *CD* Vas deferens. *O* Tooth in the cyst. *P* Hair in the same.

neoplastic degeneration. Sometimes it is very large and misshapen by the presence of one or more cysts of varying contents (Figs. 1 and 2); and if one of these cysts, by reason of its superficial location, has formed a polypoid tumor by drawing out the serous membrane, it may when palpated give the impression of a double testicle (Degive, Richard). Rudiments of cartilage, bone and teeth have also been found (Fig. 1).

FIG. 2.



Abdominal cryptorchidism. Large testicle with several cysts. Section of the same.

When affected with sarcoma or carcinoma, the testicle may acquire an enormous size; Richard found one weighing sixty pounds. Frequently, one or more *Schlerostomes* (schlerostoma equinum) are found, which have dug into the cavities or ducts of the testicle.

Gresswell observed one such tumor weighing thirty-one pounds, at whose centre there was a cavity containing cheesy pus and *strongyli.*

Degive has given us a fine description of the ectopic testicle and its attachments. It is nearly always free, movable and situated in the region of the flank, sometimes against the abdominal wall a little anterior to the pelvis, and more or less removed from the median line; sometimes between festoons of intestine, freely movable and running posteriorly into the stretched out epididymis. In some animals it is nearer to the lumbar vertebræ or bladder. Sometimes adhesions exist between the testicle and the abdominal wall or abdominal organs.

If the attachments of the testicle be examined, it will be found that, as in the case of a loop of intestine, it is fastened at the end of a broad, triangular, serous fold which passes from the sublumbar region to the bladder, parallel to the median line. This sort of mesentery is attached to the superior abdominal wall, and has two free borders —an anterior containing the testicular blood vessels, and a posterior, which contains the epididymis and vas deferens (Fig. 6). From its outer surface passes off a differently formed band, which is attached outwardly to the lateral wall of the pelvis, and whose lower, free border passing from the upper inguinal ring, or from the processus vaginalis to the tail (globus minor) of the epididymis and to the testicle, is reinforced by the abdominal portion of Hunter's guiding band, or gubernaculum testis. This band is sometimes but little developed (Fig. 6).

Fig. 3.

Abdominal cryptorchidism. Left testicle, very small.

Therefore, to resume, the testicle detained within the abdomen is suspended at the lower border of a long, broad band which, detaching itself from the lumbar vertebræ, spreads out on the one hand toward the upper surface of the bladder, and on the other toward the inguinal region.

In complete abdominal cryptorchidism there are no fascia transversalis and peritoneal serous membrane lining the sides of the inguinal canal; in their places is seen only the shallow depression previously mentioned. Degive has described a

variety of incomplete cryptorchidism in which there exists a rudimentary canal, a sort of diverticulum of a certain depth from the abdominal cavity, filled up by the gubernaculum, or the tail of the epididymis and vas deferens (Figs. 5 and 6).

In one case I saw this rudimentary canal much lengthened, cylindrical in form, about the thickness of a finger, containing only the vas deferens, and extending downward as far as the lower inguinal ring. The inguinal portion of the gubernaculum, which had the diameter of an ordinary lead pencil, was at its lower end continuous with the tunica dartos. Franck has several times found a vaginal process five to six inches in depth, which contained neither testicle nor epididymis.

Fig. 4.

Abdominal cryptorchidism.
Left testicle of medium size.

In inguinal cryptorchids the sheath of the canal, composed normally of three apposed layers (serous, fibrous and muscular), is of varying lengths; frequently it descends nearly to the lower ring, always enclosing the testicle (Fig. 11). In some horses the latter is very large, but in the majority it is very small and atrophic. According to Stockfleth it is frequently much smaller than in abdominal cryptorchidism.

The existence of three testicles (Triorchidism) in some horses has been confirmed by the observations of Delaforge (1868), Létard (1884), and Nies (1892). There are, however, cases of pseudo-triorchidism in which a cyst, or the tail of the epididymis has been mistaken for a testicle. In man, examples of synorchidism and anorchidism have been recorded. These anomalies do also happen among the lower animals. According to Stockfleth and Bang several cases of genuine monorchismus or synorchismus have been seen in the horse.

In some inguinal cryptorchids the neck of the vaginal sheath is sufficiently large to allow the testicle, provided it still retains a certain amount of mobility, to pass back into the abdominal cavity whenever the animal assumes the dorsal position; such

animals show a varying condition, at one time inguinal and at another abdominal cryptorchidism (Bang, Peterson). No wonder, then, that also a condition of unmistakable abdominal monorchidism may gradually pass away and both testicles afterward appear in the scrotum (Lindqvist).

Trustworthy observations have shown, that monorchidism is hereditary (Pangoné, Degive, *et al.*).

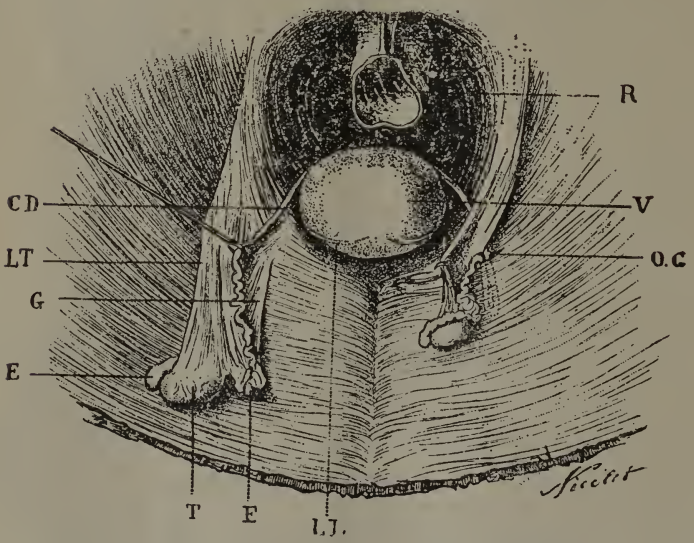
Double cryptorchids are almost always sterile (Renault, H. Bouley, Goubaux, Colin, Prangé, Riguet, Bernis). In this connection the case of "La Clôture" is very instructive. This cryptorchid, famous for his form and mettle, and for two successive years a winner in the Marsfeld running races, being afterward purchased for the stud by the royal breeders' commission, served in Pompadour not less than forty mares without impregnating a single one. On the other hand, there are horses whose testicles, notwithstanding an abnormal location, produce fruitful semen. In two testicles taken from monorchids, and weighing 4½ and 7 ounces, Möller found fully developed, living, moving spermatozoa. This case goes to prove, that, as in man so also in the horse, spermatozoa are formed in the seminal tubules of a misplaced testicle until puberty; usually, however, this formation gradually ceases and the organ becomes sterile. The escape of the semen may be rendered impossible by an induration of the corpus Highmori.

FIG. 5.

Incomplete abdominal cryptorchidism. The tail of the epididymis is enveloped by a rudimentary vaginal sheath, the lower part of which has been removed. (Natural size)

If cryptorchidism included only the anatomical and physiological conditions already alluded to it would be of scarcely any practical interest, except in animals destined for breeding. But it acts upon the entire organism, inasmuch as it exercises an unfavorable influence upon the character or temperament of an animal. The mature cryptorchid is in a continuous state of sexual excitement. Like other stallions, he seeks out the mares and approaches them whinnying. He does not seem to

FIG. 6.



Anterior pubic region, seen from above, with the usual position of the testicle in abdominal cryptorchidism (half schematic). Complete right cryptorchidism, left incomplete.

T Testicle. *E* Epididymis. *CD* Vas deferens. *G* Gubernaculum testis *LT* Suspensory serous fold, spread out. *OG* Neck of vaginal sheath and upper inguinal ring. *V* Bladder. *L L* Lateral ligaments of bladder. *R* Rectum.

be vicious in the usual sense of the word, but rather possessed of a sort of sexual insanity. Wild, menacing, fighting, disobedient, absolutely ungovernable, he runs away with his driver or tears himself free of his harness, bites and kicks, strikes with the fore-legs, and often seriously wounds animals and persons near him, especially if they attempt to prevent the execution of his desires. The only remedy for this condition is the surgical removal of the misplaced testicle.

Diagnosis.—The recognition of cryptorchidism is usually easy. Our attention is first aroused usually by the animal's impatience and fury, in connection with the absence of one or both testicles. An examination of the inguinal region may yield varying results. In true cryptorchidism one will find neither testicle nor the cicatrix of castration. In monorchidism one finds on one side an empty scrotal sac showing no scar, and on the other side a testicle, or, if it has been removed, he sees near the median line a sort of funnel-like depression with a scar at the bottom. Sometimes there is found upon the side that holds the concealed testicle, a linear, undepressed scar which has resulted from an incision made to create a deceptive scar simulating the mark of castration, and to awaken the belief that the castration has been complete. Yet it is easy to guard against this deception. If the testicle has actually been removed, the scar will always be drawn in, funnel-shaped, with its circumference thrown into folds; and above this the examiner, by deep palpation near the inguinal ring and median line, at the same time moving the fingers lightly forward and backward, may feel the stump of the testicular cord glide about under the fingers, and can follow it to the lower inguinal ring into which it passes. If the castration was not performed, but deception employed, these appearances will be lacking, and there will be found only a superficial scar or a fibrous spot, from which one or more thin fibrous cords branch out into the depths of the tissues.

Nevertheless, one error is possible, especially in young stallions in which, in spite of castration, a certain amount of sexual desire has been retained. The operator believes that he has before him a double cryptorchid, operates, and on each side exposes to view the stump of the testicular cord! The evidence of the two stumps of the cord is no absolutely infallible proof that both testicles have been removed; if the horse has retained the characteristics of the male sex, it may be reasonably presumed that on one side the operator has removed only a part of the epididymis (Stockfleth). Furthermore, there are cases in which the inguinal portion of the gubernaculum is very strongly developed and looks somewhat like a testicular cord. With a little care we can avoid confounding the inguinal lymph glands with an atrophic testicle; the former constitute an indistinct and irregular mass, which lies nearer to the median

line than the testicle. Several observations by Degive and Hendricks show that in incomplete abdominal cryptorchidism the presence of the epididymis in the inguinal canal is sometimes accompanied by hydrocele, and a local swelling much like that accompanying an omental hernia (epiplocele). Finally, there are horses in which a thickening of connective tissue, as a result of a scirrhous cord following castration, gives exactly the same impression on palpation of the scrotal region.

If we are sure that a given animal is a cryptorchid, we must then decide definitely whether it is an abdominal or an inguinal cryptorchid. From a surgical point of view, this differential diagnosis has no especial significance. For the preliminary operative measures are the same for both conditions, and if the testicle be not found in the inguinal canal, nothing remains but to continue the operation by preparing to penetrate the abdominal cavity. In most animals, however, it is possible to recognize the particular kind of cryptorchidism that exists. In the inguinal form, by bringing together the tips of the fingers of one hand so as to form a sort of cone, and pushing them into the outer inguinal ring, we can in many cases feel the testicle as a thick, roundish, more or less voluminous body. If we now pass the other hand within the rectum and forward to the anterior border of the pubis, we find the inner ring of the same side of normal character and size, and feel the thin cord passing into it. A comparative examination of both left and right inner inguinal rings with the object of detecting any anatomical differences, often suffices to remove all doubt.

In those cases in which it is impossible to make a clear differential diagnosis between monorchidism and an old castration, Ries recommends the following. Pass one hand into the rectum and carry it forward to the inner inguinal ring of the side to be examined. When this opening has been found, place the ball of the index finger over it, and instruct an assistant to seize the scrotum and suspicious scar tissue beneath the lower ring, and repeatedly draw it downward. If the testicle has been removed, the cord will be felt to glide under the finger each time the assistant pulls the scrotum downward; while in a monorchid it will remain motionless.

Abdominal cryptorchidism is recognized by the absence of the testicle from the inguinal canal, by the absence of the vaginal sheath, or the smallness of its neck and the inner ring; but especially by an examination of the intra-abdominal region

per rectum. If a finger be passed through the lower ring into the canal, it may penetrate to a considerable distance and yet not reach the testicle. If the hand is passed through the rectum to the region just in front of the pubis, the testicle may be found immediately. In complete cryptorchidism the inner ring cannot be felt; while in incomplete cryptorchidism there exists a narrow vaginal canal, in the mouth of which lies a portion of the epididymis or vas deferens, and in the vicinity the testicle. Should the latter lie deeply within the abdominal cavity, search for it will be frequently unsuccessful (floating testicle, small volume).

Degive advises passing the hand within the rectum, and with the palm against the wall of the gut to gently palpate the corresponding lateral abdominal wall from the lower median line of the pelvis to the median line above, extending forward as far as the arm can reach. In one case he found the testicle just in front of the pelvis and near the median line. Möller recommends another method—the hand first explores the region near the anterior border of the pubis and on the median line; from this place, with fingers spread widely apart and palm of the hand resting upon the inferior abdominal wall, pass forward and outward from four to six inches from the linea alba. Under the fingers the testicle feels like a small, soft, roundish or oval, movable body. Observations by Lenglen, R. Jensen, Bang and Möller prove that it may be palpated in this way and its characteristics learned. If, however, the testicle is not found by this method, we must seek the vas deferens at the side of the bladder, and follow it to the epididymis. As soon as the walls of the rectum are relaxed, this intra-abdominal examination presents no difficulties, presuming, of course, that the contents of the bowel have been previously removed by the hand, or by means of a clyster or glycerin.

History of castration of cryptorchids.—The castration of cryptorchids is an operation of modern date. Neither in the writings of antiquity, which treat of diseases and defects of domesticated animals, nor in the works of the hippiatrics of the last century, nor, finally, in the publications of the first third of this century is this operation mentioned. Even H. d'Arboval speaks but briefly of it in the second edition of his dictionary (1838).

The operation was first performed by Danish veterinarians. It was introduced into France by Marrel, and into Belgium by

Van Seymortier and Van Haelst. Till this time only the flank operation was done. We are indebted to Van Seymortier for the first description of the inguinal operation. Brogniez (1845) demonstrated experimentally the simplicity of the operation and its superiority over the other known methods. Diericx gave this operation widespread popularity in Belgium; he initiated a large number of his colleagues in his methods, and published the results of their labors (1864). In the year 1875, Professor Degive published in Belgian scientific annals an exhaustive treatise concerning cryptorchidism from an anatomical and surgical standpoint, to which work all later authors who busy themselves with this subject, have felt obliged to refer, and yet have been unable to add anything really new. In Denmark, C. Jensen (1867), H. Jensen (1869), Petersen (1872), R. Jensen and Stockfleth (1878) have published articles worthy of notice.

At that time but few French veterinarians attempted the operation. Indeed, later it stood for some time in disrepute, almost always ending fatally. In the German schools also it was not attempted. In 1878, Capon, chief veterinarian of the army and professor in the school at Samur, taught his pupils the operation, and practically demonstrated its relative harmlessness and its merits. His assistant, Jacoulet, likewise did the operation upon a large number of animals, and was the first in France to describe the essential features of his methods in a valuable article published in the *Recueil* (1886). At this time Richard (d'Aniche) had for many years castrated annually an average of fifty stallions, almost without any loss.

In Germany as in France the most skillful practitioners, Hering, Hertwig, *et al.*, did not attempt the operation. In 1885, Schmidt, after assisting Degive in three castrations, gave the German veterinarians a description of the method in the *Berliner Archiv.* During the previous year another German periodical had published an article by Nielsen, concerning cryptorchidism and its treatment by the Danish method. In 1888, Professor Möller in Berlin wrote in the *Monatshefte für praktische Thierheilkunde* an excellent essay concerning a modification of the Danish method with reports of a number of cases. Soon after this, Ostermann and Peters, two assistants at the Berlin school, sought to restore the old method of operating to professional favor, by performing it under improved

methods of antisepsis. During the years 1888–91, Donald introduced the Belgian method into England, where before him the famous American castrator "farmer Miles" and his confederates operated upon cryptorchids behind closed doors.

In the year 1889, Professor Bang, of Copenhagen, contributed to part 8 of Stockfleth's *Surgery* an excellent description of the Danish method. More recently Professor Mauri, of Toulouse, prompted by the favor with which the Belgian method was regarded by French veterinarians, wrote in the *Revue Vétérinaire* a description of his method of operating and its results. Finally, Professor Trasbot, of the Alfort school, who for years has operated upon cryptorchids with great success, has just published in the *Recueil* his very interesting experience with this condition.

Of foreign authors, mention should be made of Lindqvist, Andersen, Schöberl, Marks and Lanzillotti-Buonsanti.

Notwithstanding all these well-known articles, many veterinarians shrink from performing this operation. The entire collection of exhaustive descriptions is not sufficient to induce them to attempt it. They know that some danger attends the perforation of the abdominal wall from the deep lying inguinal canal. They mistrust, not unwisely, the assurances of certain specialists as to the simplicity of the procedure; and the contradictory statements as to the proper methods of preparing and securing an animal, with certain definite and technical details, are not calculated to remove their irresolution.

It is incorrect to believe that the operation for abdominal cryptorchidism is either very difficult or very dangerous, and it may be truly said that the ordinary castration of a normal stallion is but little less difficult and dangerous. Awkward and incapable persons should be warned against the operation. But with a good knowledge of anatomy and a fair amount of manual skill anyone may confidently undertake it. I successfully performed my first operation before I had seen one done.

Indications.—In general, the operation is indicated upon cryptorchids of whatever kind if they are difficult or dangerous to handle. On the contrary, it is unnecessary in those rare cases where the cryptorchids are docile and have neither mettle nor energy. Again, in the case of very timorous monorchid stallions, it is inadvisable to operate, on account of the damage and possible complications that might arise.

The age of the animal should be considered. The testicle does not assume a definite and fixed position before the age of three. In many stallions the movement of one or both testicles proceeds very slowly. I castrated two monorchids, aged twenty-four and twenty-six months, in each of which the fairly developed testicle was found in the lower part of the inguinal canal, and if left alone would probably have fully descended. Degive advises the operation at two years of age, from the opinion that the operation succeeds better the younger the animals are.

I agree with Mauri, that we should wait till the testicle ceases its migration and comes to a stop, in other words, that the operation should be put off till the age of three; and I may add that operative procedure in the inguinal region of an incompletely developed stallion is inconvenient and not without increased danger. Since the operation may be postponed several weeks, or even several months without disadvantage, no condition should be left unfulfilled that might contribute to ultimate success. The animal should be in good health; if it is convalescing from disease, or has been weakened by a previous disease, we should wait till complete restoration has been attained. We may operate at any season, but spring and autumn are more favorable than summer and winter; extremes of heat and cold under certain conditions favor infection through wounds. Further, sanitary conditions should be regarded. Should any infectious disease, as influenza or colt distemper, appear in the stable in which we are to operate we must wait till it disappears before operating; the injurious influence of infectious intestinal inflammations upon surgical wounds and *vice versa*, are so well known that I will say no more on this point.

Preparation for the Operation.—This is quite simple. From five to six days before the operation begin to regulate the diet by feeding only straw and clover, with which is daily given a small dose of glauber salt to empty the intestines.

Degive, who attaches great importance to the medicinal preparation, advises the administration daily for a week before the operation of two and one-half fluid ounces of a mixture of tincture of arnica and carbolic acid (6-1).

Others administer naphthol, salycilic acid, salycilate of sodium, alcohol, etc. These medicaments are superfluous

when they are not indicated by the animal's condition; they are, indeed, not injurious, their benefit is, however, questionable. The performance of the operation is facilitated by a moderate condition of nutrition; the thinner (more emaciated) the horse is, the easier will it be done.

The day of the operation, and also the previous day, the animal should fast. A half hour before casting, the rectum should be emptied through cold clysters and light exercise.

A. Operative procedure in abdominal cryptorchidism.

In order to find, seize and remove the testicle from the abdominal cavity, these chief methods have been recommended:

(1) The old method through the flank (laparotomy).

(2) The Belgian method through the inguinal canal.

(3) The Danish method through the abdominal wall near the lower inguinal ring.

1. The Old Method (Laparotomy).

Anatomical.—The region of the flank consists of three muscular layers, the most superficial of which is covered by the skin, and the innermost by a thin aponeurotic membrane (fascia transversalis) which lies directly underneath the peritoneum. The form of the flank varies with the condition of nutrition of the animal. A prominent ridge running obliquely forward and downward divides it into two parts, an upper—the hollow of the flank, and a lower part. From an anatomical point of view the several layers are of most importance.

1. The skin is of medium thickness, and quite intimately united to the underlying muscular layers through the medium of a thick layer of connective tissue.

2. The great, or external oblique muscle (costo-abdominalis) forms throughout the entire extent of the flank a second, somewhat thinner layer, which is muscular in its antero-superior part, and aponeurotic in its middle and lower parts. Its fibres pass obliquely backward and downward.

3 The small, or internal oblique muscle (ileo-abdominalis) forms the thickest layer of the flank. Attached to the external angle of the ilium its fleshy portion spreads out, in the shape of a fan, over the entire upper portion of the flank, and is prolonged by means of an aponeurosis over the lateral and inferior walls of the abdomen. Its fibres passing downward and forward cross those of the external oblique at almost a right angle, and meet the fibres of the transverse muscle of the abdomen at an acute angle.

4. The transverse muscle of the abdomen (lumbo-abdominalis) is a thin muscle attached to the transverse processes of the lumbar vertebræ. Its muscular portion occupies the hollow of the flank, and its aponeurosis stretches over the remainder of the flank. Its fibres run nearly perpendicularly. Its inner surface

is covered by a thin membrane, the fascia transversalis, upon which the peritoneum lies.

The blood vessels of the flank are the circumflex iliac artery, lower branches of the lumbar arteries and the last intercostal arteries.

Operative procedure.—The method recently revived and recommended by Ostermann, Peters, Schöberl, Marks and others consists in a laparotomy in the upper part of the flank, the drawing out of the testicle by the hand which has been passed into the abdominal cavity, and the removal of the same. The animal is either secured in a standing position should necessity require it, or cast upon the side opposite the one in which the testicle is concealed. The seat of operation being prepared, a perpendicular incision about four inches long is made in the hollow of the flank exactly midway between the last rib and the external angle of the ilium, dividing one at a time the skin and several muscular layers. Should the severed vessels bleed profusely, they should be closed by torsion or ligation. The peritoneum is then punctured with the finger, and the opening enlarged sufficiently to admit the hand. The hand is then to be passed back between the abdominal wall and the intestinal loops toward the entrance to the pelvis. When the testicle is found it is drawn out and removed either by means of an ecraseur, by torsion, or by ligation followed by excision. When the bleeding has ceased, allow the stump to recede into the abdomen, and close the wound by buried sutures; the peritoneum and muscular coat are to be sutured separately with catgut, the skin with silk. The wound is then to be covered with an occlusive dressing, or a layer of iodoform-collodion.

In double cryptorchidism, Jensen and others have removed both testicles through one opening. In order to prevent profuse hemorrhage and to favor union of the wound, the several muscular layers may be divided in the direction that their fibres run, the external oblique downward and backward, the internal oblique downward and forward, and the transverse muscle perpendicularly, as the skin.

Ostermann and Peters have made the following modification of this method: The horse is cast and chloroformed; the upper hind foot is drawn forcibly backward by two assistants. The region of the flank is shaved, washed with soap and water, rinsed with a sublimate solution, and covered by an impervious cloth having an opening where the incision is to

be made. A hand's breadth below the external angle of the ilium an incision about four inches long is made in the skin in the direction of the fibres of the external oblique muscle. The muscular layers and peritoneum are then perforated with the fingers, the testicle found and brought to the outside. The opening in the muscle closes automatically, the skin is sutured and painted with iodoform-collodion. After the operation the wound is irrigated for forty-eight hours with cold water, and then bathed with clean water till cicatrization is complete.

As to the value of this modification all discussion is superfluous. It has been observed that laparotomy is preferable to an inguinal operation when the testicle is situated in the lumbar region. This case is, however, the exception. This old method has now but few advocates. The Berlin assistants were unable to reinstate it. The practical experience of the past year manifestly assigns it to the last rank.

(To be continued.)

CLINICAL REPORTS.

TRAUMATIC PERICARDITIS IN A COW.

On the eve of October 31, a Jersey cow, about seven years old, was brought to the hospital by a veterinary student who gave us the following history: Animal first showed signs of sickness about October 1, when a "cow doctor" was called, and diagnosed "wolf in the tail;" he slit the tail, in which he put common salt.

According to the owner's statement, the animal seemed well after this treatment, until October 16, when barn door was left open and she remained out all night. October 17 the student was called, and found her with back arched, coat staring, flow of milk stopped, and rumen impacted; temperature 103.4 F., pulse eighty-nine; constipated and fæces streaked with blood. The temperature and pulse gradually increased until October 25, when temperature was 105.6 F., and pulse 108; animal then greatly emaciated and very weak; an œdematous swelling now appeared in dewlap, about half the size of a water bucket: splashing sounds could be heard with each heart beat. On October 29, temperature 103 F., pulse ninety-two and stronger.

When animal entered hospital she presented the following symptoms: Greatly emaciated, coat staring, appetite lost, disinclined to move, if forced to do so, would groan. Bowels regular, but fæces very dark. There was an œdematous swelling of dewlap, a little larger than a bucket. Temperature 106 F., pulse 120, respirations sixty-four per minute. On auscultation, both sounds of the heart could be heard, but were quite feeble; with each beat could be heard a splashing sound of metallic clicking character.

On percussion, there was an increased area of dullness of heart region. There was also found an area of dullness in lower part of right lung. One peculiarity of this case was, that owner said he never heard any coughing. No venous pulse could be detected.

We wished to keep her alive for the following morning clinic, so gave diffusive and heart stimulants and antifebrin, but in spite of this, she died about 7 a. m.

Post-Mortem Lesions.—There were strong, partially organized, fibrous adhesions between second stomach and diaphragm, also between latter and pericardium. A fistulous tract from second stomach, through diaphragm into pericardial sac; this was closed anteriorly, and contained considerable pus; the walls were thick and fibrous.

The mucous membrane of second stomach was thickened and red, and pieces of the epithelium could be easily pulled away.

The pericardial sac contained at least two gallons of a thick brownish sero-purulent fluid, containing broken down red blood corpuscles and clots of fibrin.

Both visceral and parietal pericardium were greatly thickened and completely covered with dense fibrin, stained brown by the fluid in sac.

In the pericardial sac was found a wire, about three inches long and one-sixteenth inch in diameter, corroded and bent.

The heart was hypertrophied, and very friable; in cavities were "chicken fat" clots.

The left lung showed a hypostatic congestion, and the lower part of right lung, a red hepatization.

The other organs were normal.

Diagnosis.—Traumatic pericarditis, caused by a wire which passed from second stomach into pericardial sac.

Cause of Death.—Heart failure, due to inflammation of pericardium and collection of fluid in pericardial sac.

C. E. Cotton, V. M. D.,
House Surgeon, Veterinary Hospital,
University of Pennsylvania.

CASE OF PARALYSIS OF THE SUPERSCAPULARIS NERVE.

The following clinical case, brought under my observation, will perhaps be of interest to the practitioner:

The patient was a five-year-old road mare.

History.—In June, 1891, she fell down while being driven; she rose, attempted to run away, was pulled to one side and

thrown down, forcibly abducting or spreading the near member away from the body. Immediately after getting up, she was intensely lame and at every step the scapulo-humeral articulation would bulge or slip outward ("shoulderslip" of some writers) as if its attachments to the side of the thorax had been almost completely torn away. She was taken to the Veterinary Hospital, placed into slings and remained under my observation for about six weeks.

Local symptoms, excepting some atrophy of super- and sub-spinati muscles in the course of a few weeks, were absent. No swelling of the shoulder joint or its surrounding muscles, no pain on pressure or in moving the member in various directions, no heat, in fact, nothing except the peculiarity in locomotion could be detected. The treatment consisted of stimulating lotions, intended more for a moral effect and to secure immobility of the parts than for a curative purpose. In the next case, I would try subcutaneous injections of strychnia locally, and perhaps electricity would be of some value. In several weeks the abnormal locomotion slowly improved, and every now and then the movements of the shoulder for a step or two would be normal. At the end of six weeks she was turned to pasture, walking a distance of several miles. The lameness, which in great measure was mechanical, still continued to improve, but it was not until the summer of '92 that she was thoroughly cured, and the normal form of the shoulder restored.

At first I had anticipated rupture of some of the pectoral or scapular muscles, but there were no consecutive phenomena to warrant this, and I concluded to make a diagnosis of *paralysis of superscapular nerve* with possibly involvement of the subscapular nerve. The superscapular nerve, a branch of the brachial plexus, passes outward through the large mass of connective tissue between the shoulder and the great serratus muscle, turns around the anterior border of the scapula to reach its external face, ennerving the super- and sub-spinati and giving a few filaments to the subscapularis, precisely supplying with motor nerve filaments, the muscles which, when paralyzed, would produce those symptoms indicated above. We know that the principal utility of these is to act as ligaments to the shoulder joint, and to hold the latter against the side of the chest, their function in executing the

movements of the shoulder during locomotion being of secondary importance. Passing transversely outward to the inside of the shoulder, and lying against the shoulder blade, and covered by the scapular muscles which are more or less unyielding from the tension of the external scapular aponeurosis, the nerve may be easily overstretched from forced abduction of the member or be subjected to pressure from traumatisms to the subscapular tissue or rupture of some of the fibres of the scapular muscles and thus produce paralysis of the muscles which it supplies.

In scanning over English veterinary literature, I have been unable to find a true designation and correct pathology for this condition (at least to my knowledge). The terms "shoulder-slip," etc., which may be expressive to the eye, are, to say the least, crude and only designate a symptom and not the actual disease. One cannot be too generous to estimate the value that can be obtained by the anatomical relations with certain symptoms and careful study in the autopsy room.

S. J. J. Harger.

SARCOMA IN THE HORSE.

The patient was a bay gelding, twenty years old, which I bought for experimental purpose. At the superior part of the anterior border of the neck and extending along the lower surface of the throat into the intermaxillary space was a spherical tumor about as large as a man's head, which had been increasing in size for eight or nine years. Excepting the inconvenience from its weight, the growth did not interfere with the welfare of the animal. Excision of the tumor being the only alternative for its removal, Drs. Harger, Cullen and myself performed the operation. A cutaneous incision, about one foot in length, was made over the enlargement on the median line and its surface which was covered by, and attached by connective tissue to the mastoido-humeralis, subscapulo-hyoideus, sterno-maxillaris, sterno-hyoideus and sterno-thyroideus muscles and the trachea (below and on the sides) was carefully enucleated from its attachments with the fingers and the blunt scissors. This procedure was comparatively easy, because the growth was more or less encapsulated. The jugular

veins and carotid arteries passed over its surface and were connected with it by means of very large vascular branches, some of the veins being almost as large as the jugular itself. Numerous ligations of these vessels were necessary and the hemorrhage was very copious, even threatening.

The wound, which was very large, was cleansed antiseptically, in the ordinary manner, with iodoform and bismuth subnitrate, packed with oakum, its lips united with interrupted sutures, and treated subsequently as usual. It healed kindly, excepting at one point which discharged continuously. Sometimes there were spells of coughing with considerable discharge from the mouth and nostrils, otherwise no visible alteration. Patient was destroyed and the autopsy showed the right lung and its bronchial tubes completely filled with pus. The tumor was examined microscopically by Dr. Robert Formad, and was found to be a round-celled sarcoma undergoing cystic change. Its weight, immediately after removal, was ten pounds.

J. T. McAnulty.

1445 S. Eighth street.

THE GERANT'S DRAWER.

A drawer will be reserved in our editorial sanctum for the reception of communications from members of the profession and gentlemen interested in the profession's welfare, which may be addressed to the Gerant of the MAGAZINE, and after his perusal the communication will be handed over to the gentleman of the staff most able to reply.

As an instance of these letters, let us picture the young graduate just as he escapes from the confines of college life. Entering the arena of public life, he finds strange affinities to those he has been accustomed to.

The world outside the college is many degrees colder, the sympathies are absent, and when in quest of any or all his needs, the outside world does not listen to his supplication, but whispers, "here, young man, help yourself."

How to embark in practice is one of the first difficulties the young practitioner has to encounter; it is a shoal upon which many a young man has stranded on the morn of his embarkment. Parents cannot furnish the counsel needed here, unless the family belongs to the profession, thus the tyro can approach the Gerant and receive matured advice and counsel.

In this column will be found many interesting articles on general professional economy and ethics, tending to inculcate principles of integrity, so that professional emulation may abound in lieu of jealousy. Everything tending to unite the members of the profession will be advanced, and that which will bring the general public into closer acquaintance with its value will not be lost sight of.

The MAGAZINE shall be made the profession's journal in spirit and in truth, in all that pertains to general welfare.

PAN.

OUR CRITIC.

"*Nulla venenanto littera mixta joco est.*"—OVID.

Journalism gives rise to criticism, and without criticism, journalism would fail to rise to estimation. There is, however, a latitude in criticism which should at all times be in the mind of the critic, particularly in the matter of "extent."

Honest criticism, conducted in a true spirit of generosity, is at all times as advantageous to the author of the criticised matter as to the readers. It is said that a court lord once found fault with the "disagreeable necessities of warfare." This is as reasonable as finding fault with honest criticism.

Changes have occurred since Cowper wrote of—

"The folio of four pages, happy work, which not e'en critics criticise."

We might quote lines from Pope's "Essay on Criticism," v. 5:

"'Tis hard to say, if greater want of skill
Appear in writing or in judging ill:
But of the two, less dangerous is th' offense,
To tire our patience, than mislead our sense."

Again, v. 297:

"True wit is nature to advantage dress'd,
What oft was thought, but ne'er so well express'd;
Something, whose truth, convinc'd at sight, we find,
That gives us back the image of our mind."

The perusal of the above will tend to draw our readers to apprehend our sense of criticism before we open the column, and to assure those who favor us with their contributions of articles that, in all this, we shall show impartiality as to the source from whence these articles come, for our own men will come in for their share.

Fallacy will be elutriated, errors adjusted, and zigzag writings straightened out; for these must come, as Pope explains in his "Dunciad," book I, v. 121:

"Round much embryo, much abortion lay,
Much future ode and abdicated play;
Nonsense precipitate, like running lead,
That slipp'd through cracks, and zigzags of the head"

We will not allow our readers to be asked to ingurgitate anything we cannot take ourselves. We will not gloze anything, but give it its deserts. PAN.

ABSTRACTS.

TRICHINOSIS IN BELGIUM.

In one month of the present year thirty-nine persons in Belgium contracted trichinosis, thirteen cases proving fatal.—*The Medical Age*, December, 1893.

THE CONSTANTINOPLE VETERINARY SCHOOL.

The Ottoman Government has applied for two graduates of the French Veterinary Schools to become teachers in the Imperial School at Constantinople. They are to give instruction in the theory and practice of external and internal medicine, zootechny, anatomy, physiology, bacteriology and shoeing.—*The Veterinary Journal and Annals of Comparative Pathology*, December, 1893.

SCARLET FEVER AND MILK.

Dr. H. Clothier, medical officer of health, Hornsey, Middlesex, is reported to have traced an outbreak of scarlatina—eighteen cases within twelve days, with one exception—to the use of milk obtained from a dairy in St. Pancras, which had been supplied from a farm at Hendon. The steps taken by the medical officer are said to have quickly arrested the progress of the malady.—*The Veterinarian*, December, 1893.

THE CATTLE PLAGUE IN RUSSIA.

Count Orloff Davydow has made a gift of 10,000 roubles to the Institute of Experimental Medicine of St. Petersburg, which is to be bestowed as a reward upon anyone who will discover a method of protecting animals against the cattle plague, or efficacious treatment of this terrible epizootic disease, from which Russia suffers more than all the other countries of Europe. Thus in the month of January of the present year, in European Russia alone and in the Caucasus it carried off 8243

animals, exclusive of 1938 slaughtered by the veterinary service to prevent the extension of the scourge in regions where it was still possible to contend with it.—*The Veterinary Journal and Annals of Comparative Pathology*, December, 1893.

CATTLE POISONED BY EATING ACORNS.

Among the numerous cases of this kind which have been reported, it is said that during the past week upwards of 100 cattle have died in the neighborhood of Eynsham, Oxfordshire, from this cause. The cattle belonged to several proprietors, Lord Abingdon, of Wytham Park, having lost twenty; Mr. James Mason, of Eynsham Hall, ten or more, and another gentleman in the same neighborhood a similar number, whilst all around the district the farmers generally have lost one or two animals. So serious has been the loss, that a warning has been issued calling attention to the injury likely to arise if cattle are allowed to stray where oak trees abound.—*Press*, November 10. *The Veterinarian*, December, 1893.

AN EPILEPTIC CANARY.

M. Fere tells the Société de Biologie that epilepsy is not unfrequently met with among birds. "Hitherto, however, only two such examples have been recorded in detail. I recently had under observation a canary thus affected. The attack commenced suddenly with a kind of aura, the bird extending its wings. The movement was followed immediately by a turning of the head to one side and then the animal fell. Generalized tonic spasms were then succeeded by clonic spasms, these stages being followed by a period of stupidity, often accompanied by impulsive acts."

The editor of this journal has observed the same phenomena in three different species of grouse, also in wild turkeys, cockatoos and parrots.—*The Medical Age*, December, 1893.

COBRA POISON IN MOTHER'S MILK.

A Mahommedan beggar woman and her infant child (aged about one year) recently died in Madras. It would appear, says the *Times* of India, that the deceased woman was bitten by a

cobra, and while in that state she nursed the child, which also died from the effects of the poison. With reference to this statement, Sir J. Fayrer says: "I think it quite probable. I long ago showed that the blood of an animal poisoned by cobra virus is itself poisonous when placed in the stomach. Nothing is more probable than that the milk of a woman so poisoned should be poisonous to the infant, but is it quite sure that the infant did not die of some other cause?"—*British Medical Journal.*

(Might cows' milk carry similar poisons?—Ed.)

TORSION OF THE UTERUS.

Franck bases its direction upon the twisting of the vagina, but it must be remembered that in mild cases this is not very marked. According to Zaessinger, the anterior border of the broad ligament infringes upon or constricts the genital passages. When the torsion is to the right, the constriction is due to the ligament on the right side; when it is to the left, that ligament causes the constriction. The operator will always find, at the bottom of the vagina and in the region of the os, a resisting cord constricting the vagina and presenting at times pulsations. This cord may be directed from above to below, behind to before and from left to right, or from right to left, above to below and behind to before.

In torsion to the right the cord is directed from behind to before and from right to left, and *vice versa* in torsion to the left.—*Journal de Médecine Vétérinaire et de Zoötechnie.*

PLEURO-PNEUMONIA.

Another outbreak of this disease was discovered early in November, when a cow from one of the London cow-sheds affected with the disease was exposed in the Metropolitan Market. In consequence of this the movement of cattle out of the market was stopped, except with licenses to go to a slaughter-house for slaughter. Some store cattle and dairy cows which were in the market on that day were slaughtered by order of the Board of Agriculture, and their full value paid to the owners. In slaughtering out the lot of cows, which were in the same

shed as this diseased cow, three others were found affected with the disease.

During the present year there have been eight outbreaks of pleuro-pneumonia in Great Britain, twenty-nine diseased cattle, 1142 cattle in contact and seventy-three suspected have been slaughtered by order of the Board of Agriculture. In the corresponding period of 1892, there were twenty-five outbreaks, 134 diseased cattle, 3412 contact cattle and 172 suspected slaughtered.—*The Veterinarian*, December, 1893.

CATS AND DIPHTHERIA.

Doctor Edmund Gwynn, Medical Officer of Health for Hampstead, has forwarded us the following case, which may be of interest at the present time, when diphtheria in London is on the increase, as showing once more that the disease may sometimes be traced to domestic pets. In February last, a cat in a tenement house situated in Fleet Road was noticed to be very ill and suffering from a bad swollen throat. On February 24, a child, aged five years, who had been nursing the cat, was sent into the Northwestern Hospital suffering from diphtheria. The cat was subsequently sent away for treatment, but returned to the premises on July 22, enticed back by the children of the house, with whom it was a great favorite; it was still in a bad state of health and suffering from an unhealed abscess in the vicinity of the throat. On July 26, two other children were found to be affected with sore throat, and one was removed to the hospital, suffering from diphtheria, on July 31. The father of the children, believing the cat to be the cause of the infection, destroyed and buried it, much to the indignation of the landlady, so that no opportunity was afforded of examining the animal.—*British Medical Journal. The Medical Age*, December, 1893.

MICRO-ORGANISMS FOUND IN HUMAN MILK.

Ringle, dissatisfied with the results obtained by Escherich, Cohn, Neumann and Palleske, all of whom described numerous pathogenic as well as non-pathogenic micro-organisms in human milk, investigated twelve healthy and thirteen diseased nursing women. Ringle thought that after the child had sucked

for some time infection of the breast might occur through bacteria remaining in the larger ducts, and if, in securing the milk for experimentation, he would express all of this and take the milk from the deep parts of the breast only, he would secure sterile material. The nipple and aureole were carefully cleaned with alcohol, $\frac{1}{1000}$ bichloride of mercury and again by alcohol. Small quantities of milk were secured from deep portions of the breast by a small pump, terminating in a bottle, and after varying lengths of time, small quantities were removed and cultures made. Out of the twenty-five experiments, the milk was found to be sterile only three times. In seventeen cases the staphylococcus pyogenes aureus was found. Once the staphylococcus pyogenes aureus and albus were found in combination, and twice the staphylococcus pyogenes aureus and streptococcus pyogenes were found together. It is no wonder that abscess of the breast is of frequent occurrence, when the pyogenic bacteria are so frequently present in the milk. These researches also lessen the probability, which some suspected, that milk possesses bacteriacidal power. (Münchener, *Med. Wochenschrift*, 1893, No. 27. July 4, p. 513.)

THE FREQUENCY OF TUBERCULAR CHANGES IN THE HUMAN CORPSE.

Schlenker (*Achiv. für Path. Anat. und für Phys. und für Klin. Med.*, Vol. cxxxiv, Part 1, p. 145) studied 100 cadavers with the object of finding how many were affected with some one of the numerous forms of tuberculosis, and found the following :

The number in which tuberculosis could be demonstrated was sixty-six, of which

(*a*) Tuberculosis the principal disease and cause of death, thirty-five (fifty-three per cent).

(*b*) Tubercles present in considerable number, four (six per cent).

(*c*) Latent tubercles, twenty-seven (seventeen per cent.)

There were thirty-four cases entirely free of tuberculosis.

In thirty-six cases of latent tuberculosis of adults, which he observed, the disease was localized as follows : bronchial glands, twenty-one cases ; mesenteric glands, three cases ; lungs, five cases ; intestine, two cases ; lung and bronchial glands, two

cases ; lung, bronchial and cervical glands, one case ; bronchial glands, axillary and nucal glands, one case; all glands, one case.

From these figures the writer concludes :

1. Tuberculosis is much more widely distributed than is ordinarily supposed, and heals with relative frequency by assuming a latent course.

2. That the difference in the figures of various authors is due to the difference in the districts and the kind of material on hand.

TUBERCULOSIS IN THE DOG.

Cadiot observed forty cases of canine tuberculosis, in the great majority of which the disease was suspected because of the wasting and other clinical symptoms. Other cases were produced by inoculation with exudate from the pleura, pericardium and peritoneum, and in these the tuberculosis was proved, after death, by bacteriological investigation.

The lungs were affected in thirty-five cases ; the pleura and bronchial and mediastinal glands in twenty-five ; the pericardium in seven ; the heart in three ; the mesenteric glands in twenty-three ; the peritoneum, mesentery and omentum in eleven ; exudative pleuritis and ascites were found in nineteen ; pericardial effusion was observed in six.

In two cases specific lesions were observed upon the respiratory mucous membrane. The mucous membrane of the right bronchus was thickened and covered with papillomatous new-formations. The tracheal mucous membrane showed numerous large circular eminences with central depressions. The glottis was tightly closed by a bi-lobed tumor of the vocal cord. In two cases large tuberculous masses were seen in the kidneys, the cortex being almost entirely destroyed by them.

The hypertrophic prostate was infiltrated by tuberculous granulations, the gray fluid obtained from it containing numerous tubercle bacilli.

Canine tuberculosis is generally of human origin, and generally occurs through the respiratory system. In more than half of the cases the dog lived with a tuberculous master. The tubercular dog is also a danger to the people with whom it lives, especially the children.—Congress for the Discovery of Tuberculosis, 111th sitting, Paris, July 27, August 2, 1893.

AUSTRALIAN MEAT—HOW IT IS PREPARED.

An Australian paper gives some details as to how Australian meat is preserved. The winter months are the season of operations, the preserving process being more easily accomplished in cool weather. The cattle are purchased by weight, each carcass, when skinned and cleaned, passing under a steelyard. The meat is cut up in small pieces, boiled in soup in scalders, strained and tinned, and the tins when soldered are packed in cases of various sizes. The tins themselves are of various capacity, from two pounds up, but six pounds is the commonest size. The soup is reduced to an extract by means of a series of condensing pans and this finds a ready market in England. From the caul and kidney fat about two tons of butterine are weekly turned out, and the bones, offal and other refuse are boiled down for tallow, of which there are two grades. The shank and marrow bones go to England with the horns, hoofs and tail hair; the other bones are sent to a drying-shed and in the slack season reduced to bone-dust by a crushing machine at the works, and thus converted into a fine soil fertilizer. This year some corned meat has been tinned, but marrow and tongues have been treated in this way each season.

Taking nine works situated on the Orara River, we find there is a plant for the extraction of neat's-foot oil, no portion of the beast being permitted to go to waste, save the blood. The boning of the meat is done by contract, as is also the making of the tins, the company importing the tin-plate from England and likewise the material for solder. The tinsmiths have a department of their own, fitted up with the requisite appliances peculiar to the trade. A cooper on the premises constructs the casks for tallow and butterine. A blacksmith's forge provides for the necessary iron-work and repairs, and the pine for the packing-cases is cut at a circular saw bench at the works from logs that are obtained from a forest in the district some thirty miles distant. This is a separate contract. The packing and shipping are also done by contract.—*The Veterinarian*, December, 1893.

RETIREMENT OF PROFESSOR BROWN, C. B.

Notwithstanding the circumstances that the profession, as a whole, have probably learned through the public press of the

retirement of Professor Brown from the office he holds in connection with the Veterinary Department of the Board of Agriculture, we have deemed it right to record the circumstance in our journal for future reference, should occasion arise in which it might be required.

Professor Brown retires on the principle which regulates officials of the civil service, viz.: the length of time they have held office. Not unfrequently this time is extended, and it has been so in his case.

Twenty-eight years have passed since his first appointment —1865. This, it will be remembered, was the year of the introduction of the cattle plague.

Within a week or two the malady had extended to the metropolis and had manifested itself among some cows belonging to Mrs. Nicholls, adjacent to the metropolitan cattle market lairs. The rapid death of several animals led to the belief that they were poisoned, and Professor Simonds was consulted. To his great surprise he recognized the existence of cattle plague.

Waiting for a few days for confirmation of this opinion, he lost no time in calling on Mr. Arthur Helps, clerk to the Privy Council, and communicated the fact. Instructions were given to keep the Council daily informed of its threatened extension, and it was soon found necessary that a department should be extemporised in consequence of its rapid spread to various parts of the country.

Dr. Williams was placed at the head of the department, and Professor Simonds' services were retained as veterinary consulting officer. The work increased so rapidly that additional veterinary help was required, and Professor Brown was selected. History has proved that no better choice could possibly have been made.

As assistant veterinary adviser, Professor Brown remained until the end of 1891, when, in consequence of the death of Professor Spoone, Principal of the Royal Veterinary College, Professor Simonds retired from the department to take the vacant office at the college, and Professor Brown became chief veterinary officer. This position he has continued to hold throughout, first under the Privy Council office and now under the Board of Agriculture.—*The Veterinarian*, December, 1893.

THE PASTEUR INSTITUTE.

The Annales de l'Institut Pasteur, recording the work done there during the months of August and September, state that the total number of persons under treatment there as a preventive against hydrophobia, was 243, of whom 208 were French and thirty-five foreigners. Out of this total nineteen had been bitten by animals which had been experimentally proved to be mad; 155 by animals declared by veterinary certificate to be mad, and sixty-nine by animals only suspected to be so. The bites were inflicted in 215 cases by dogs and twenty-four cases by cats, in three cases by cattle and in one by a horse. Three deaths are reported as having occurred during the two months, the first being that of Auguste Morel, aged 18, a groom in Paris, who, at the end of May, was bitten in three places on the right nostril, the wounds being very deep and only slightly cauterized. The dog which inflicted the bite also bit a dog, which was placed under observation at the Alfort Veterinary College and died of rabies at the end of July. Morel was under treatment at the Pasteur Institute from May 30 to June 16, but he did not complete his treatment, and it was reported officially that he had died on August 4 at a hospital at Chateau-Gonthier. The second death was that of Alfred Fages, aged 40, a mason at Alias, in the department of the Gard, who had been bitten on July 12 by a stray cat. There were deep bites on the right hand, and here again the wounds had been insufficiently cauterized. Treated at the Pasteur Institute from July 14 to July 28, Fages felt pain in the right hand on August 15, and died on August 20, after exhibiting all the symptoms of hydrophobia. The third death was that of Jean Marie Montessuy, aged 57, a small farmer at St. Pierre-de-Rumilly, in the Haute-Savoie. Bitten on July 15 by a dog, ascertained to be mad, in sixteen places, all of the wounds being deep he was not cauterized, and underwent a course of inoculations at the Pasteur Institute from July 18 to August 6. Upon August 21 he felt twinges in the right thumb, and died on August 24, after having, as described by the local doctor, betrayed all the signs characteristic of hydrophobia.

The same number of the *Annales* also contains a record of the work done at the Pasteur Institute in Moscow, where 907 persons were treated in the year 1892, of whom 613 were men and 294 women. Out of this total, 178 had been bitten by animals

experimentally proved to be mad; 439 by animals declared by veterinary certificate to be mad, and 290 by animals only suspected to be so; the bites having been inflicted in 769 cases by dogs, in seventy by cats, in forty-five cases by wolves, in eleven by horses, in eight by cows, in two by pigs and in two by human beings. Only six of the 907 persons had died, so that the mortality during the year was not more than 66-100 of one per cent. —*The Veterinary Journal and Annals of Comparative Pathology*, December, 1893.

WORM DISEASES IN SHEEP AND OXEN IN QUEENSLAND.

For the information of some of your correspondents, I have written the following short account on the nodular intestinal disease of sheep and oxen, together with particulars of a scheme for freeing the country of worm parasites. The nodular disease was at one time regarded here by veterinarians as a form of actinomycosis, but by microscopical examination I had convinced myself some years ago that it was neither that disease nor tuberculosis. Had I at that time examined the nodules on the mesentery and omentum, in which the embryos of œsophagostoma are always to be found, instead of contenting myself with the examination of the intestinal ones alone, which are, as a rule, full of caseous material and free from parasites, I could not fail to have discovered the true cause of the disease. However, upon the publication of Dr. Curtice's work on the parasites of sheep ("The Animal Parasites of Sheep"), in which the nodular condition is carefully described and shown to be due to a worm parasite, the œsophagostoma, we were all made acquainted with the true nature of the disease. This parasite, which is perhaps the worst of the intestinal worms of sheep, appears to be spreading in this and the adjoining colony; yet there are still many runs which remain free from it. My attention was drawn to the fact whilst at Lake's Creek last year, that one batch of sheep, some thousands, would be found affected by the œsophagostoma, whereas not one individual of another lot would have the disease, demonstrating in a remarkable manner that some runs are badly affected whilst others are free. The intestine performs a most important function—that of absorbing the digested food. Every portion of the

mucous surface injured by the parasite—and the whole of these injured portions in a bad case might amount in the aggregate to one-twentieth of the absorbing surface—means that the sheep is losing nutriment and must, even were it able to keep up condition, eat very much more than a sound sheep would have to eat. The worm parasites of sheep, fluke and lung worms included, are propagated by means of eggs, which pass out with the excrement or otherwise, and eventually find their way into water. The water acts as a medium through which they gain entrance again to other animals. Now it follows that if sheep could be supplied with pure water they would never become infested. I have often thought that squatters might gradually free their runs from parasites in the following manner: Fence off a portion of the run, into which put horses only; fence off all the swamps, waterholes and creeks; erect windmills to pump the drinking water into troughs. After one year has elapsed remove the horses and stock with sound sheep. Operate now on a second portion, and so on. Undoubtedly the fencing and windmill would be expensive. Still I am of the opinion it would ultimately pay to do it. The rationale of the method is: (1) That the parasites of horses, with one doubtful exception, the lung worm (*Strongylus micrurus*), do not live in sheep, and that the part of the run under operation need not remain unoccupied. (2) During the year the eggs of the sheep-worms which have already been distributed all over the area would perish or be washed into deep water, where they would be out of harm. (3) The new stock of sheep being free or practically free from parasites, drinking at the troughs of water would remain uninfested. If this method could not be adopted on account of the expense, the following one might add greatly toward the same end: Fence off all swamps or drain them; deepen out the waterholes, especially at the places where sheep drink. In deep water the parasites would have very little chance again of entering sheep, for the eggs and embryos lie at the bottom. It is in shallow swampy water where the danger is so great of their being sucked up with dirt from the bottom. It must be remembered that overstocking increases parasitism, not alone from the causes previously mentioned, but by necessitating the animals to bite close to the ground and to eat food soiled by excrement.—Dr. T. L. Bancroft. *Veterinary Journal.*

THERAPEUTIC NOTES.

POKE ROOT.

Phytolacca decandra has special affinity for glandular tissue. Many times mastitis may be prevented or aborted by the timely application of equal parts of fluid extract phytolacca and glycerin. Again, in tonsilitis use both internally and as a spray or gargle. The rapidity with which relief is obtained is almost magical.—*The Medical Age*, December, 1893.

REACTION OF PNEUMO-BACILLINE IN GLANDERS.

M. Arloing has investigated whether pneumo-bacilline, whose pyogenic properties in cattle are very marked, can supplant the use of mallein in the diagnosis of glanders.

The results have entirely fulfilled his anticipations. In eight horses, four of which were affected with glanders, the reaction was sensibly the same as that resulting from the use of mallein and tuberculine. However, the local inflammatory swelling following an injection of pneumo-bacilline was less marked than that which results from the employment of mallein.—*Journal de Médecine Vétérinaire et de Zoötechnie.*

TREATMENT OF NASAL CATARRH WITH TERPINOL.

Terpinol is an hydrated essence of turpentine and has been employed in catarrhal affections of the respiratory passages. Inocencie Aragòn reports four observations in which he has had the best results.

The internal administration of terpinol acted very favorably in cases of intense and inveterate catarrh of the nose. The treatment was a little prolonged, because of the chronic form of the disease. Aragòn recommends its employment in all affections of the respiratory tract accompanied by excessive secretion of mucus or muco-purulent discharge.

The terpinol is administered in pill form, each containing 1 g. 50 of terpinol and 1 g. 50 of benzoate of soda ; six or eight are administered daily according to the tenacity of the disease.—*Gacetta medico veterinaire.*

TREATMENT OF TÆNIA TONSURANS IN THE HORSE.

MM. Fourie and Le Calvé have found a rapid cure for this parasite in the horse, recommended by Dr. Cutler: Crystallized phenic acid, tinct. of iodine, hydrate of chloral, aa.

They are applied as follows: The hairs of the region being shaved off, the area is washed, and the mixture applied to it as well as to the surrounding healthy skin. In a few hours an inflammatory swelling one or two millimetres in thickness is seen, resembling the phlyctænia consecutive to a blister. The swelling soon disappears, the epidermis becomes hard, and in a few days the scab loosens and falls off. A new, healthy skin forms underneath and new hairs grow and cover the part, although often of different color. In employing this mixture it is necessary to protect the surrounding skin on account of the caustic action of the preparation. The preparation is caustic and must not be applied too copiously nor continued too long.—*Journal de Médecine Vétérinaire et de Zöotechni.*

CITRULLINE AND COLOCYNTHINE AS PURGATIVES IN THE DOMESTIC ANIMALS.

Citrulline and colocynthine are resinous extracts from colocynth. Professor Ellenberger has concluded from his experiments, in 1887, that these substances given in clysters exercise a specific purgative action accompanied by general excitation and anal irritation, but that its subcutaneous injection cannot be recommended on account of the large doses which are necessary, and its feeble and uncertain action. Kohlstock has obtained the same results in man, and does not advise its subcutaneous injection on account of the acute pain it causes at the point of injection; but by rectal injection, even in small doses, .02 g. (⅓ gr.), he has always found citrulline an efficient purgative. Purging has commenced at least seventy minutes after the administration.

Baum experimented with citrulline on the horse, goat, sheep, dog and pig, giving the drug through the rectum and dissolved in equal parts of glycerine and alcohol (95%) with the following results:

Horse.—The experiments were repeated seventeen times on

six healthy horses. The dose employed each time was 1 g. to .1 g. (15–1½ grs.) dissolved in 200 gms. (50 ʒ) of glycerine and alcohol; 1 g. produced decided purgation, which was more marked if the citrulline was given in four or five divided doses at intervals of a half-hour, than if it was given in one dose. Immediately, or a few minutes after the injection, soft fæces were ejected, defecation became more frequent and abundant, and accompanied by the expulsion of large quantities of flatus. Peristalsis increased, became more audible, and could be heard even without applying the ear to the abdomen. The action of citrulline is by local irritation, as well as by its circulation through the blood, as was demonstrated by the experiments on the dog, and those of Kohlstock upon men. This method of administration in the horse is the better, especially in mild cases of chronic constipation. The price of the drug is 1 f. for 40 gms.

Goat.—Two goats were treated through the rectum, each with .025 g., dissolved in 40 g. of alcohol and glycerine, in two divided doses. The purgative action in this animal was feeble, and the action was by direct local irritation.

Pig.—Five experiments were made upon the pig, giving .05 g. doses in 80 to 160 g. of alcohol and glycerine mixed. The purgative action was marked, especially when the drug was given in two or three doses at short intervals. Its action results principally from a local action upon the intestines. Citrulline would, therefore, be a good purgative in the pig, to which it is difficult to administer drugs.

Sheep.—The experiments upon the sheep confirmed those of Ellenberger; .1 g., dissolved in 80 g. of a mixture of alcohol and glycerine, was injected in two doses and produced moderate purgation. Larger doses were not employed on account of the price of the drug.

Dog.—Eight experiments upon three dogs demonstrated that in this animal rectal injection of citrulline is a very efficacious purgative, whose effects can be prolonged for several days. It always constitutes a veritable diarrhœa. The dose is 5 to 2½ centigrammes, according to the size of the animal, in 120 to 80 g. of excipient liquid; it is given in divided doses at intervals of one-half hour. Larger doses produce abdominal pain, dysentery, retching, emesis and asphyxia. As the purgation commences only in fifteen to twenty minutes after the injection,

and continues for several days, it must be concluded that the citrulline is absorbed and acts through the circulation, contrary to what is observed in the horse, goat and pig. It is a valuable drug in constipation.

Baum has also experimented with colocynthine, the extract allied to citrulline, and also found in colocynth.

Even in large doses injected into the rectum of four horses, colocynthine had little or no purgative action. In the experiments on three sheep, its purgative properties were very feeble and insufficient. In the pig, rectal injections of .025 to .05 g. in 40 g. each of alcohol and glycerine, determined abundant purgation, which could be largely attributed to the action of the alcohol and glycerine.

In the dog, colocynthine has marked purgative properties, acting in part locally on the mucous membrane and partly through the circulation.—Professor H. Baum, *Revue Vétérinaire.*

PROCEEDINGS OF SOCIETIES.

MASSACHUSETTS VETERINARY ASSOCIATION.

The regular monthly meeting of the Massachusetts Veterinary Association was held at 19 Boylston Place, Boston, on Wednesday, December 27, 1893, at 7.30 p. m.

The president, Dr. Burr, in the chair.

The members present were Drs. Becket, Bryden, Burr, Carlton, Emerson, Howard, LaBau, Marshal, Osgood, Parker, Rogers, Sherman, Winchester and Winslow.

The minutes of the previous meeting having been read, Dr. Osgood said he wished to make a correction; in answer to Dr. Simpson's question about the appointment of inspectors, he had said that the original appointment lay with the cities and towns. The inspector need not be a veterinary surgeon. If he was not satisfactory to the board, however, he could be removed by them and another inspector appointed at a salary of not over $500 per annum. With this correction the minutes were adopted.

New Business.

The secretary then read a letter from the new Veterinary Magazine asking the support of the association.

Dr. Osgood moved that the new journal get a copy of the society proceedings as well as the old journals (*Veterinary Review* and *Journal of Comp. Med.*).

Dr. Carlton then read an interesting paper on "Homœopathy as Applied to Veterinary Medicine."

Mr. President and Gentlemen: When I received a note from our secretary reminding me that a paper was expected from me to-night, I had forgotten that twelve months ago I had promised one, consequently I had made no attempt at preparing it. So on the plea of lack of time and the fact that the subject was not of my own choosing, but suggested by Dr. Peters, I ask you to excuse my shortcomings, and perhaps you may get an idea or two from what I am to read, the subject having at least the recommendation of novelty.

As some of you are aware, about fifteen months ago I gave up my veterinary practice in order to study human medicine, and desiring some knowledge of homœopathy, I entered the Boston University School of Medicine as a candidate for the degree of M. D. What little I have to say will be largely taken from the work of others, my own experience necessarily having been rather limited.

At first, let me give briefly the history of homœopathy and the principles which underlies the application of medicines under the law of *similia similibus curantur*.

The founder of the school was Samuel Hahnemann, a German physician, who, late in the eighteenth century, while experimenting with cinchona bark, discovered its power to produce certain symptoms similar to those existing in diseases for whose cure it was administered. The idea that he had discovered a universal law

flashed upon him, and he proceeded to "prove" various other substances and to bring into prominence medicines whose therapeutic virtues had not previously been known.

As you are doubtless aware, "proving" substance consists in administering to a number of healthy persons some substance the nature of which is to them unknown, and noting the effect produced. It is customary to give one or more of the provers some innocuous substance, in order that symptoms due to the imagination may be eliminated.

Under the law of similars, the remedy would be useful in the cure of a disease the symptoms of which resembled those produced in the provers.

Remember now that homœopathy does not necessarily imply infinitesimal doses, although a good many of that school do believe that they can effect cures with quantities of drugs so small that our imagination cannot reach them. Be that as it may, the homœopathic idea is not large dose of a remedy, not small dose, but the right remedy.

And now we come to the brief discussion of a number of remedies: Colocynth, the bitter cucumber, as many of you will testify, has in its proving the following symptoms: Intermittent, colicky and increasing spasmodic pains, accompanied by a cold sweat and relieved by hard pressure, very severe while the paroxysms last, but the intermissions are free from pain. Colocynth will almost immediately relieve a case with the above symptoms, as I have demonstrated to my own satisfaction in several cases of spasmodic colic. The pain should be purely a neuralgic one, and not due to any organic lesion, in order to have colocynth of avail.

Aloes, with which you are all familiar as a cathartic, is also useful in cases of diarrhœa not produced by the drug. A case of scouring in which there is some rumbling of the bowels, pain before passage of fæces, which escape without effort and accompanied by a good deal of flatus, and more or less straining when the rectum is empty, such a case would probably yield to aloes. I can personally recommend aloes in hæmorrhoids, both in man and beast. It will be found useful in various inflammations of the large intestines and especially in congestive diseases of the anus and rectum.

Nux vomica, which in its provings was found to produce constipation, gastralgia and dyspepsia as a few of its symptoms, is an exceedingly important member of the homœopathic materia medica. Unfortunately for us, it acts more powerfully on the carnivora and omnivora than on the herbivorous animals, still it is by no means without value in veterinary practice. It is of use in colic from over-eating, accompanied by constipation and frequent, ineffectual attempts to pass manure. It is of value in dogs who are over-fed, constipated and have insufficient exercise; but remember that no inflammation of the mucous surface shall exist, if it is desired to use nux.

This is one of the many remedies that is used homœopathically by the old school, who prescribe it or its alkaloid, strychnia, in small doses in sick headache or migraine cardialgia and gastralgia.

In my own experience it has seemed indicated in the following: In a case of torpidity of the bowel of a horse. 2. In a so-called fitty horse, whose trouble appeared to me to be caused by indigestion. 3 and 4. In two cases of gastric disturbance in dogs, both accompanied by constipation, fever and want of appetite, and one of which was rather severe.

In all of the above, the treatment was eminently successful, the administration of nux vomica being followed by recovery, and that rather soon. Of course the animals might have recovered anyhow, but that is something one might say about any case and whatever the treatment, excepting, of course, in surgery.

Belladonna is well known to you. That again is a drug which doubtless you all have used homœopathically. Take one instance only, that of pharyngitis. Belladonna has in its proving the same inflamed, dry, sore throat, for which we are in the habit of prescribing it. In conjunctivitis and various other inflammations of the eye it is widely used.

Its sphere is almost unlimited, and it would be useless for me more than to mention it. In one case of a horse subject to fits, as the owner said, I used it for two weeks, reducing the number of attacks from one or more daily to one during the ortnight. Unfortunately I left the place then and am unable to state whether a permanent cure resulted.

In the *Medical Advance*, for October, 1893, are reported a number of cases from which I shall quote, in all of which the treatment was successful.

Rhus toxicodendron, the sumach or poison oak, was used in a case of a horse lame forward. Conium or hemlock was used in several cases of azoturia. As far as I can find out, conium is homœopathic to the paralysis of the disease. As azoturia may, and often does, result fatally, it strikes me that conium is well worth a trial.

Pneumonia with phosphorus for a remedy, glonoin or nitro-glycerin was given to a horse with blind staggers.

Kali. carb., carbonate of potash in leucorrhœa in bitch, with general inflammation of the genitalia, and arsenic in diarrhœa in an ox and in chicken cholera.

What I have said will be a nucleus on which to build to those of you who are at all interested in the subject. Remember that I have merely touched on a very few of the drugs which are in daily use by homœopathists. My knowledge of the subject is very much limited, but the more time I give to it, the more I am convinced that on the whole it is the most rational system of medicine known at the present day. I can only say, don't condemn it until you have given it careful study and trial. I was, a few years ago, as skeptical in regard to homœopathy as are any of you, but reflection, study and actual practice have convinced me that curable diseases can be cured more easily and quickly by a rational homœopathy than by any other known method. And if this be true of men, why not apply the principle to veterinary practice?

F. B. Carleton, M. D. V.

In the discussion which followed, Dr. Winchester said that he had never "hung up his shingle" as a homœopath, at the same time he is a firm believer in small dosage. One of the most useful drugs he has used is "veratrum viride;" he has used it for a number of years for all sthenic troubles and all sthenic febrile conditions, from whatever cause, in small doses, repeated frequently. In speaking of the difference in the action of drugs in different cases, he said that he had a 1600-pound horse that morning sick with azoturia; he had given a hypodermic injection of 2½ gr. morphine and less than ½ gr. atropine at 10 a. m.; at 4 p. m. the horse was "blind as a bat." At other times he has given as much as 40 gr. morphine and 5 gr. atropine, and has not had the same results. On the other hand, he has seen horse crazy from 1½ grs. morphine and ¼ gr. atropine.

Dr. Carlton thinks the result in these cases was due to the atropine being in excess.

Dr. Winchester says it is a fact that we can give some horses proportionally a much greater amount than others.

Dr. Osgood thinks Dr. Winchester gave excessive dose in combination; has never seen horse get 3 grs. morphine and 1 gr. atropine without going crazy. The combination intensifies the action of both drugs. In the horse, opium has the same action as belladona.

Dr. LaBau cited a case he had seen in Springfield with Dr. Osgood, who had given 1½ grs. morphine and ¾ gr. atropine in two doses; when he, Dr. LaBau, arrived some time later, he found the horse pressing his head against the wall with dilated pupils.

Dr. Osgood believes that in aconite small doses repeated are better than large ones.

After some further discussion, Dr. Winchester moved that a vote of thanks be given the essayist. Seconded by Dr. Winslow and carried unanimously.

Dr. Bryden then read an interesting paper on quittor.

In the discussion which followed, Dr. Bryden said that the average time he allowed for a true quittor to heal was seven months.

Dr. Marshal said that when he was with the St. R. R. Co., he had had a great number of cases of quittor. These cases were treated with sulphate of copper injections and poultices; he had not found it necessary to treat any horse for seven months. They had usually good results.

Dr. Bryden said it was not fair to take a number of cases and bunch them; the history in each case should be considered separately. Where tissue changes have gone on, it was impossible for them to heal in a few weeks.

Dr. Howard asked the essayist if he keeps the horse at work, or if he poultices and allows him to rest.

Dr. Bryden says that where the horse is not lame he poultices and works.

Dr. Sherman says his treatment consists in paring away all the horn in the neighborhood of the sore; he puts shoe on and does not touch sinus. Whenever he has probed and injected, he has had more trouble. He simply keeps hoof away from shoe and the case gets well.

Dr. Bryden explained that he considered true quittor to be where there was a condition of hoof where the tissues are confined and degenerated (not so far as necrosis), but a certain amount of degeneration has gone on and the circulation is dammed back. Then, when by the removal of horn and softening of the foot by poultices, the obstruction to the circulation is removed, the tissues spring back into life again. If a bird's plumage is removed, it is impossible to make it grow in a day or two. In the same way, if a foot is confined and the coronet tight, the tissues below are interfered with, a process of degeneration goes on, cartilaginous changes set in and the cartilage becomes hypertrophic. He thinks that the pathological changes in the foot ought to be thoroughly studied.

Dr. Winchester referred to paper read at the meeting in Chicago, where the fistula was due not to external violence, but to internal causes; he thinks that is what takes place in the form of quittor referred to by Dr. Bryden. The speaker then referred to a case of sidebones he had treated on Dr. Bryden's theory with excellent results.

Dr. Howard remarked that they all admitted that quittor could arise as Dr. Bryden described. Some of those present seemed to think that it was only one form of quittor; according to Dr. Bryden it is a matter of faulty diagnosis.

After some further discussion, the meeting adjourned with a hearty vote of thanks to the essayist.

JOHN M. PARKER,
Secretary.

VETERINARY MEDICAL ASSOCIATION OF NEW YORK COUNTY.

A recent movement of great importance and rich with promises of great good to the profession, has been undertaken by the New York State Veterinary Medical Association. Through the officers, there are being sent out printed instructions appointing county secretaries, with power delegated to them to establish county societies wherever there is a reasonable number of veterinarians. Under a call for this purpose, there was created in New York, January 25, a society that in numbers and representatives was the strongest and best gathering of New York City's veterinarians that has ever been attained. There were but few absentees among the well-known veterinarians, and in most instances they signified by letter their approval of the movement.

The president of the U. S. V. M. A. had been asked to lend his influence and presence in behalf of the movement, and was nominated by the appointed secretary, Dr. Giffen, to call the meeting to order. In a few brief words of thanks for the privilege conferred, he referred to the great good accomplished by veterinary associations and to the gratification afforded by so many veterinarians gathered for the purpose of union in the first city of the land.

The selection of officers being in order, the following choice was made: President, R. S. Huidekoper; vice president, Jas. L. Robertson; secretary, J. E. Ryder; treasurer, Thos. Giffen.

The following members of the profession then signed as members of the association: Drs. Henry Amling, Geo. C. Beckett, W. V. Bieser, R. Buckley, G. B. Burchstead, C. C. Cattanach, J. S. Cattanach, J. J. Cattanach, W. A. Conklin, T. E. Delaney, R. H. Dickson, T. H. Doyle, O. C Ferley, J. H. Ferster, Thos. Giffen, H. D. Gill, H. D. Hanson, R. S. Huidekoper, Ed. Loomes, H. Neher, Arthur O'Shea, Chas. A. Parkerson, Jr., P. Richards, J. L. Robertson, J. E. Ryder, Chas. Sielman, Thos. Sherwood, Wm. Swan, T. W. Turner and J. B. Thompson.

A committee was selected to draft a suitable constitution and by-laws, consisting of Drs. J. S. Cattanach, J. E. Ryder, H. D. Gill, H. Neher, Chas. A. Parkerson, Jr., J. L. Robertson, Thos. Sherwood, O. C. Farley and Geo. C. Beckett.

A preliminary report was made as follows: That the name of the organization be "The Veterinary Medical Association of New York County."

That the officers be president, vice-president, secretary and treasurer and a committee of five members, which shall be known as the board of censors, to be appointed by the president at each annual meeting. That meetings shall be held on the first Tuesday of each month, except during July, August and September.

The meeting to be held in December to be known as the annual meeting, at which time all officers are to be elected for the ensuing year, to take office at the following meeting.

Members shall consist of:

1. Charter members: All those practitioners of veterinary medicine who assist in the organization of the above association and conform to the regulations formulated by a two-thirds vote of those in attendance at the meeting of the organization.

2. Future members: Elected members, who shall be graduates of veterinary institutions, which are legally entitled to grant veterinary diplomas and which shall be recognized by this association as properly equipped, qualified and conducted for the same.

Dues: Each member of the association shall pay an initiation fee of $5, and yearly dues of $2, payable annually in advance.

On hearing the report, an amendment was offered by Dr. Giffen that registered men who are non-graduates shall be eligible for membership, providing their application is received within two months, after which members will have to be qualified, registered and graduates.

Said committee was continued.

Dr. W. Horace Hoskins, president of the U. S. V. M. A., was unanimously elected an honorary member.

The following members of the profession also signed the call for the formation of the society: Drs. Birdsall, Burget, P. Burns, W. J. Coates, S. S. Field, S. K. Johnson, W. H. Jackson, J. C. Leighton, A. Liautard, T. Ogle, E. A. Parsons, A. Sherk. After which the meeting adjourned to meet Tuesday, February 6, 1894.

VETERINARY NEWS.

STATE SECRETARY ACKERMAN, of New York, has received the appointment of veterinarian to the Brooklyn Board of Health.

—

THERE will be a conference of the Comitia Minora of the United States Veterinary Medical Association in March. At this meeting will be determined the place of our annual convention.

—

SECRETARY RIDGE, of the Pennsylvania State Veterinary Medical Association recently entertained the members of the Farmers' Institute with the subject of "Inspection of Farm Produce."

—

THE list of resident, State and foreign corresponding secretaries of the United States Veterinary Medical Association just announced comprises a large number of strong aggressive workers.

—

ANOTHER famous herd of jerseys, prize winners in points and producing powers at many fairs, have just been reported to the New York State Board of Health for destruction on account of tuberculosis.

—

A NEW departure in association appointments of the United States Veterinary Medical Association is to make no announcements until the appointee has indicated his willingness to accept the duties involved.

—

THE Westminster Kennel Show, at Madison Square Garden, New York, has a remarkably fine display of the different varieties of large dogs, notably St. Bernards, Newfoundlands, Great Danes, setters and pointers.

Dr. J. F. Connor, of Philadelphia, a graduate of the Veterinary Department of the University of Pennsylvania, has succeeded Dr. James A. Stuart at the Canebrake Agricultural Experiment Station, Alabama.

—

The spring meeting of the Illinois State Veterinary Medical Association was held at Springfield on the twenty-first of February. Secretary Wilson, of Mendota, is a very earnest and active association worker.

—

A painful injury inflicted by one of his patients as well as a severe cold caused the absence of Professor Liautard from the organization of the County Veterinary Medical Society, in New York City, on the evening of January 25.

—

An amendment to their rules is pending before the Philadelphia Pathological Society to admit graduates in veterinary science to regular membership. This is a well-timed step and is of great import to comparative pathology.

—

Where will be the favored city for the "94" meeting of the United States Veterinary Medical Association? Ohio veterinarians recommend Cleveland or Columbus. Pennsylvania veterinarians are in favor of holding the meeting in Philadelphia.

—

Representative Holland, of Messrs. Sharp & Smith, of Chicago, veterinary instrument makers, has just completed an Eastern tour of all the large cities, displaying for the benefit of the busy practitioner an unusually attractive collection of new instruments.

—

It is to be sincerely hoped that we have seen the last of the proposed private veterinary colleges, whose only support is the prospect of a large class of students, not always won by such inducements as are destined to make them educated scientific veterinarians.

1894 promises to be a memorable year in association circles; never were there so many associations in active work, never before so many meetings planned and so much material offered for consideration. We are in an era of remarkable veterinary intellectual enlightenment.

—

Senate No. 1456, Senator Kyle.
House No. 5308, Mr. Pickler.

AN ACT to fix the pay, allowances, pensions, retirement and rank of the veterinarians of the United States Army.

Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled:

SECTION I. That the United States Army veterinarians shall have the pay, allowances, pensions, retirements, tenure of office, and the relative rank of second lieutenant of cavalry; their appointment to date from original entry into the army. *Provided*, however, that hereafter, candidates for the United States Army veterinary service shall comply with all the preliminaries now required from candidates for "The Army Medical Corps," and shall pass such examinations as the Secretary of War may direct.

SEC. II. This Act shall be in force and effect from and after its approval.

SEC. III. All Acts inconsistent with this Act are hereby repealed.

This bill is highly endorsed and recommended by the War Department, and by all the high ranking cavalry and staff officers, as a matter of economy and necessity to the government and as justice to the army veterinarians.

—

THE Maryland State Veterinary Society was to have met at the Hotel Studio, in Baltimore on the evening of the nineteenth of February. This society is one of the oldest and has been one of the most active of the State societies. It was established about nine years ago. At one time it had a membership of twenty-six and the papers read before it were printed in all of the veterinary magazines and read with interest by veterinarians in all parts of the country. Its reputation for enthusiasm, good fellowship and thorough scientific work was of the

best. It is only natural that with the abundance of good material for such a society that exists in Baltimore and other parts of Maryland that a society of the excellent character of the one described should have been organized and supported. With a history to be proud of, it is very sad to contemplate the lapse that has taken place in the interest of the members of the Maryland Veterinary Society. Their proud history should stimulate them to the most earnest efforts and such are especially necessary at the present time on account of the proposed legislation in that State. At the last meeting (that was to have been) there were present but three members and three visitors and as five are required for a quorum it was impossible to call the meeting or to transact business. The members present were Dr. William Daugherty, Dr. A. W. Clement, Dr. W. H. Martenet, all of Baltimore. The visitors were Dr. Robert Ward, Baltimore; Dr. Price, Centreville, and Dr. Leonard Pearson of Philadelphia. Three papers were on the program, but two of the essayists defaulted at the last moment. One essayist was present, but did not read his paper on account of the small audience, another essayist had two cases of colic, two cases of "congestive chill" and one urgent call to the country, all at the same time (!) and was therefore unable to attend. The other essayist did not take the trouble to send an excuse. This state of affairs is exceedingly oppressing to the faithful friends of the society who have worked long and diligently for the good of their fellow practitioners and who have not been deterred by any outlay of time or means in doing everything that might be of value to the veterinary profession in Maryland. They certainly deserve better support and it is not to the credit of the members of the Maryland association that they do not receive it. At the present time State Veterinary Societies have more to do than ever before, their work is of greater importance now than it was when they were organized. Legislation governing the practice of veterinary medicine has been passed in some States; others are without such laws, but in all constant watching and constant effort are required to assure the veterinarian his proper legal position. Public questions relating especially to the inspection of meat and milk and farm animals and live stock in general are attracting more attention every day and it is essential that the State Veterinary Societies should take an active and leading part in

these discussions and formulate measures for the control and eradication of the contagious diseases and for the inspection of food products if they wish to maintain their proper position. A very good act to regulate the practice of veterinary medicine has been prepared by the members of this society and is now before the Maryland Legislature. It is being pressed urgently and all signs indicate that it will eventually pass. Those who are doing the brunt of the work in effecting its passage are those who need its protection the least, while those who are benefited by it are standing back and allowing others to work for them and are giving but little moral or financial assistance.

—

THIS BILL was reported favorably by the Hygiene Committee of the House and has not yet gone to the Senate. It is a model for State legislation on the subject it proposes to regulate.

A BILL, entitled an Act to regulate the practice of veterinary medicine and surgery in the State of Maryland:

SECTION I. Be it enacted by the General Assembly of Maryland, That a commission is hereby established, to be known under the name and style of "The State Veterinary Medical Board," to consist of five commissioners, who shall be members in good standing of some school of veterinary medicine, who shall be appointed by the Governor every four years, and who shall hold their office until their successors are duly appointed and qualified, with power in and to said board to adopt by-laws and regulations, such as they may deem advisable to carry into effect the provisions of this Act; provided the said by-laws shall not conflict with the Constitution or laws of this State or of the United States.

SEC. II. It shall be unlawful for any person or persons to practice veterinary medicine and surgery in the State of Maryland without having previously obtained a diploma from a college duly authorized to grant such to students of veterinary medicine and surgery, or to those who have passed satisfactory examinations before the State Veterinary Medical Board, or as herein provided for.

SEC. III. The said State Veterinary Medical Board shall hold their meetings at such times and places as they may deem

best, which times and places shall be set out fully and regularly in their by-laws.

SEC. IV. The said State Veterinary Medical Board shall examine all diplomas as to their genuineness, and each applicant not holding a diploma shall submit a theoretical and practical examination before the State Veterinary Medical Board, said examination to be written, oral, or both, which examination, if passed to the satisfaction of the said board, shall entitle the applicant to practice veterinary medicine and surgery, subject to provisions and regulations of this Act and regulations of the said board.

SEC. V. All examinations of persons not graduates shall be made directly by the State Veterinary Medical Board, and the certificates given by the said board shall authorize the possessors to practice veterinary medicine and surgery in the State of Maryland. All examinations of ungraduated practitioners must take place before the thirty-first day of December, eighteen hundred and ninety-four. After that date no certificate shall be granted, except to persons presenting diplomas from legally chartered colleges.

SEC. VI. Any person shall be regarded as practicing veterinary medicine and surgery, within the meaning of this Act, who shall have received a license as mentioned in section 4, but nothing in this Act shall be construed to prohibit members of the medical profession from prescribing for domestic animals in case of emergency and collecting a fee therefor, nor to prohibit gratuitous services in an emergency, nor to prevent any person from practicing veterinary medicine and surgery on any animal belonging to himself or herself. And this Act shall not apply to commissioned veterinary surgeons in the United States Army.

SEC. VII. And be enacted, That it shall be the duty of such board to keep a register of all practitioners qualified under this Act practicing veterinary medicine and surgery or any branches thereof in this State, and to cause the same to be published at least once a year in two newspapers published in the city of Baltimore.

SEC. VIII. And be it enacted, That the said board shall within six months from the date hereof, prepare said register, in which the names of all graduate practitioners in the State at the time and in actual practice shall, on application to the

said board, be inserted without examination, and shall also on application insert the names of such persons who are practitioners in actual practice without a diploma or certificate or qualification from a recognized school, who have been in practice for five years and upwards, prior to the passing of this Act, upon proof to the said board that they have been so practicing; that all persons practicing at this time and not having been so practicing for five years antecedent to this Act, shall undergo an examination before the said board, and if found by said board competent to practice, the persons so examined and approved shall be entitled to registration.

SEC. IX. And be it enacted, That the said board shall have power to reject any applicant for registration whose examination papers or diploma are not satisfactory.

SEC. X. And be it enacted, That on and after six months from the date of the approval of this Act, no person shall be permitted to practice veterinary medicine or surgery or any branch thereof in the State of Maryland, who does not possess a diploma issued from a college or school of veterinary medicine, duly incorporated and legally licensed to issue diplomas, and if said diplomas shall be issued after the first day of January, 1895, it shall be received only from a college or school of veterinary medicine which shall require a three years' course of study before issuing said diploma, and shall have passed such examination or test as may be from time to time instituted as a test of qualification by such board, and persons producing such certificates or diplomas who pass such test examination shall, on payment of such fees as hereinafter are provided for, be registered as veterinary practitioners.

SEC. XI. And be it enacted, That no moneys shall be paid out of the State Treasury for the use or purposes of this Act.

SEC. XII. And be it enacted, That any person not registered who shall practice veterinary medicine or surgery, or any branch thereof, within the State of Maryland, shall be deemed guilty of a misdemeanor, and shall be fined in the sum of not less than one hundred nor more than five hundred dollars for each offense, or imprisonment in the House of Correction, for any term not less than three months, nor more than twelve months, for each and every offense.

SEC. XIII. And be it enacted, That the said board shall be the prosecutor in all cases under this Act, and that such fine

and imprisonment may be imposed by any Justice of the Peace of the city of Baltimore, or any county where such offense may be committed.

SEC. XIV. And be it enacted, That a moiety of the fine imposed under this Act shall be paid to the informer, and the other moiety shall be paid into the county treasury wherein the offense shall be committed.

SEC. XV. And be it enacted, That every county practitioner shall lodge his certificate issued by the board at the time of registration with the Clerk of the Circuit Court of the county, and cause his name to be registered in a book for that purpose, to be kept by the clerk, who shall be entitled to a fee of two dollars for such registration, and in the case of removal or death of practitioner, the clerk of the county shall give notice thereof to the said board that all practitioners practicing in the city of Baltimore shall register with the Clerk of the Court of Common Pleas, who shall enter such names in a book for the purpose, and be entitled to a fee of two dollars for so doing.

SEC. XVI. And be it enacted, That this Act shall take effect from the date of its passage.

ADDITIONAL copies of the proceedings of the United States Veterinary Medical Association for 1891-92 having been secured by the officers, may be obtained at the secretary's office for the cost price of two dollars per cloth-bound and one dollar and seventy-five cents per paper copy.

Subscription membership is still open at two dollars for the proceedings of the Thirtieth Annual Meeting and the First International Congress.

T. J. TURNER, *Secretary*,
Columbia, Mo.

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Thierärztliche Wochenschrift

Herausgegeben
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Dr. W. Dieckerhoff, Dr. R. Schmaltz,
Professoren an der thierärztlichen Hochschule zu Berlin.
Dr. R. Lothes,
Departements- und Kreisthierarzt zu Koeln.

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Fleisch- und Milchhygiene.

Herausgegeben
von
Dr. med. Robert Ostertag,
Professor an der thierärztlichen Hochschule zu Berlin.

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THE
VETERINARY MAGAZINE.

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HYDROPHOBIA.

BY LOUIS O. LUSSON, V. M. D.,
Ardmore, Pa.

Hydrophobia, rabies, lyssa, from the Greek word meaning rage, fury, was first described by Aristotle, 325 B. C., as the most dreaded of all diseases. It is a contagious disease with nervous symptoms—contagious through the medium of the saliva, and experimentally by inoculation from the medulla oblongata. Confined principally to the canines and felines.

Indirect Causes.—Largely theoretical, are climate (unknown in Iceland, but found very frequently in northern Russia among wolves and long-haired dogs), scarcity of water, rutting, homesickness, species.

Direct Cause.—Entrance of the saliva from rabid animal into the tissues of a healthy one. All secretions are harmless, except the saliva. Contagiousness of saliva after death is very limited. (Eighty-three per cent of animals bitten by authentic cases escape the disease.) Period of incubation is very variable; a week, a month, years—usually about four weeks. Longest period of authentic case in dog, 7½ months; horse, 5½ months. During the whole period of incubation the animal remains healthy. Just before development, point of inoculation becomes very much inflamed.

Symptoms.—Local and general. Local: Hyperæsthesia at region of inoculation. General: Perverted sensibility and paralysis.

Forms.—Furious and mute or paralytic.

Furious Form. First Stage.—Disposition changes (more aggressive or affectionate). There is excessive sensibility of the skin. Animal is always on the alert. Light or noise brings on a convulsion of the whole frame. The animal seeks seclusion, is thirsty, but has difficulty in drinking on account of irritability of larynx and pharynx; may take solid food (prefers foreign matter to food). Hyperæsthesia of nervous system lasts from six hours to three days.

Second Stage.—Perverted sensibility. Animal begins to wander; when he stops he conceals himself. Will attack any creature or object in his track, but rarely deviates from his course. Will attack one of his own species in preference. Barks or howls (very characteristic). Will bite himself at certain points, showing that there is nerve irritation at these points. This stage lasts three or four days, when animal will return home in an exhausted condition to be protected.

Third Stage.—Paralysis or anæsthesia. Local and general paralysis. Now have paralysis of throat, and animal cannot howl. Distressed facial expression. If stirred up we may observe a temporary stage of fury. Animal dies of nervous exhaustion in a few days. The complete course of the disease is about ten days to two weeks.

Mute Form, which is quite frequently met with in house dogs, has about the same course as the former, with the exception of the wandering and desire to attack. Animal has a pitiable expression and wants to be caressed, is afraid of strangers, eats foreign matter, is unable to drink, because throat is paralyzed. There is partial paralysis of the hind quarters and, finally, animal dies of nervous exhaustion in from seven to ten days.

Alterations after death are all secondary. Mouth coated with little vesicles, lymphatics are swollen. The Greeks called these "lyssa," supposing them to be little worms which cause madness. Larynx and pharynx very much congested, and a large amount of foreign matter in the stomach. As these animals are dangerous to mankind, when diagnosis has been made, they should be killed.

Case 1.—Mongrel, Scotch terrier, aged, in fair condition, and accustomed to being in the house, stopped eating, seemed worried, wabbled behind, much depressed. He could drink

on the first day I saw him. I made a rectal examination and found the rectum empty.

Second Day.—Mouth open, tongue protruding, continual moaning, partly paralyzed, did not rest comfortably, not aggressive. Died of nervous exhaustion in about four days.

Case 2.—Skye terrier, in the same house as Case 1, about one month later; aged, and in the habit of sleeping in lady's bedroom. He had eaten about one-half yard of bath towel. When called, administered dose of castor oil. Next night he ate part of a skirt; was continually on the move, with nose down. Would eat dried leaves, and attack the feet of persons in the room, particularly if the person moved. The lady would not have subject destroyed, but attended to it herself, protected with heavy gloves, animal being rather more affectionate than before the attack. The dog was allowed to live about five days, when I administered a large dose of morphia. During the whole period of the disease there did not seem to be any irritability of throat or paralysis. He was capable of lapping fluids at all times, and the characteristic howl was absent throughout the disease. I consider both cases typical mute rabies.

Case 2.—Interesting on the account of the peculiar symptoms. I was rather stimulated to write this brief and incomplete article, after hearing at a meeting of the Montgomery County Medical Society, at Norristown, Pa., a most exhaustive paper on hydrophobia, by Dr. Hiram Corson, a venerable gentleman of ninety years. He described the disease most elaborately, from the time of Aristotle to the present, and after citing a large number of cases in human subjects taken from his own case-book and those of other prominent physicians all over the country, he endeavored to prove that all the cases of so called hydrophobia were not hydrophobia at all, but "Acute Mania," brought on by the thought of "going mad," biting relatives and friends, and finally being smothered to death under a feather bed. Dr. Corson said that this was a deplorable condition of things, and he thought that if the physician was called in time, *moral persuasion* would cure all the so-called rabid patients. He gave many examples of moral persuasion, one of which was particularly impressive. A young man about twenty years old was bitten by a supposedly mad dog. Some months after the doctor was called, found the patient in bed,

confined by being strapped and held down by two or three strong men. In the words of Dr. Corson, "I had him released, and called for some water, in which I mixed about one-half grain sulp. morphia (thinking it applicable in this case) and gave it to the patient, saying to his mother and brother who were in the room 'Go down to the kitchen and heat a large poker to white heat, and if the medicine does not have the desired effect in twenty minutes, we will take the hot poker and run it down his back from neck to tail, right through to the bone.' In five minutes I asked the patient if he felt better, the only response was a grunt; in ten minutes the response was audible 'Yes,' and in fifteen minutes a 'much better.' As it was quite late and storming, I said that I would go home, but to his brother, 'Don't forget the hot iron.' Of course, this was said within the hearing of the patient. Next morning I called and found my hot-iron-cured friend in the field plowing."

Now, my brothers of the profession, Dr. Corson's explanations sound particularly plausible coming from such a veteran, but in my opinion if rabies does not occur in man neither do any of the contagious diseases of animals communicable to man. That authentic cases of rabies in man are very rare, I freely admit, because only about seventeen per cent of dogs bitten by authentic cases of rabies develop the disease, and only five per cent of the rabid dogs bite members of the human family, and only ten per cent of those bitten become hydrophobic. Some argue that because we have never found two patients, supposed to be hydrophobic, with the same set of symptoms, they do not believe this disease to exist in man. Each case is different from the others, but still we believe it to be rabies. I think that if these skeptics wish to prove that hydrophobia, rabies or lyssa is not communicable to man, they should make some inoculations; and as they, like St. Thomas, believe that "seeing is believing," I think they should begin by experimenting upon themselves. As there are quite a number of non-believers in the country, the result would be *positive*. If I stir up the minds of more able Veterinarians upon this thread-bare, but just now latent subject, and call forth criticism, I shall achieve my purpose.

Ardmore, Pa.

The fore feet are markedly more susceptible to the disease than the hind, and the outer cartilage than the inner one. It is not only to be found upon aged horses, but may appear soon after young animals are put at work, though much depends upon the nature of the ground upon which the animal is used. If used upon the soft fields and roads of the country, or other unpaved surface it is quite improbable that any symptom of this affection will ever be perceived. But when a horse, fresh from the soft roads and grass-carpeted fields of the country, is put to fast work upon the paved and plastered streets of the city, scarcely two months will sometimes elapse before he will show a labored, constrained gait.

The *diagnosis* of incipient ossification is quite difficult, and requires considerable experience in estimating the changes in form of the hoof, and a good understanding of shoeing. The diagnosis, however, becomes much easier as soon as the ossification has so far advanced as to force the coronet noticeably outwards, or as to be felt upon careful examination as a hard, somewhat uneven prominence under the skin just above the coronet.

The *causes* of this ossification are numerous, but the chief one is *uneven footing* due to an abnormal direction or conformation of the limb and foot; fast work upon hard pavements, and heavy pulling, being the determining causes.

When both cartilages of a foot are ossified, the normal expansion and contraction of the quarters is partially or even completely arrested; while, when only one cartilage is ossified, this physiological movement can occur only in the opposite quarter.

Since wearing away of the wall at the quarters is largely dependent in the shod animal upon the friction between hoof and shoe, which occurs whenever the quarters expand under the weight of the body, it stands to reason that when this alternate expansion and contraction is arrested by rigid, ossified cartilages, the normal wear of the wall at the quarters occurs much more slowly than normal. In this case lack of wear, and not rapidity of growth is accountable for the unusual length of wall at the quarters found each time an old shoe is removed. When but one cartilage is ossified, normal wear occurs on the sound side, but not on the diseased quarter, in consequence of which the latter becomes gradually higher.

The physiological movements of the healthy half of the foot are increased in extent, and this half grows broader. The diseased half on the contrary contracts, its wall approaches the median line of the sole, and the bar crowds upon the branch of the frog, partially or completely obliterating the lateral lacuna, followed by a noticeable shrinking in volume of this half of the frog. Drying out of the hoof favors contraction of the walls and the production of contusions or corns of the vascular and sensitive podophyllous tissue between the unyielding ossified cartilage and the wall contracting upon it. The wall of the quarter which contains an ossified cartilage is often pushed upward, and is sometimes marked with rings.

It is needless to hope to restore the ossified cartilage to its normal condition, for the condition is incurable; all that can be done is to prolong the animal's usefulness for an uncertain period. This may be accomplished by proper shoeing, and proper care of the hoof. However, it should be remarked, that a horse that has done laborious and fast work upon hard streets, and is affected with ossification of both cartilages of a foot is no longer worth much, at least, little good can come from shoeing; yet such an animal will usually travel quite freely and work well upon soft ground.

Let us suppose that we have a case of one-sided ossification of lateral cartilages and, further, that it is the outer cartilage, since this is the one usually affected. We will notice immediately that the old shoe has been irregularly worn away. The outer branch is thin, while the inner branch shows very little, or almost no wear. The preparation of such a hoof consists in lowering the outer wall which, from a loss of motion by reason of its ossified cartilage, has not worn away as rapidly as the opposite wall, and is therefore noticeably higher. The inner wall should be rasped on the side so that its circumference will be diminished and a better position and shape given to the foot. The internal lateral ligaments of the phalanges, which were abnormally stretched and strained so long as the outer wall was too high and the axis of the phalanges seen from in front was bent outward from the coronet to the ground, are again under normal tension. In order now to obtain for the foot a base of support which shall be of normal size and shape, we apply a special shoe. The best results are obtained from a plain flat shoe whose outer branch is wide

enough to cover the entire thickness of the wall and white line, and at the same time to support the coronet, so that a vertical line dropped from any point in the coronet to the ground shall touch the outer border of this branch. The nail holes must not extend too far back in this branch, and should be placed well in from the outer border so as to fall upon the white line. The "concave" of the upper surface of the shoe should terminate directly behind the last nail hole. The inner branch should be rather narrow, and follow the wall closely back to the angle between wall and bar, which it should support. The nail holes in this branch should be punched nearer the edge and may extend back nearer to the heel. The relative lengths of the branches vary, but the outer is almost always to be longer than the inner.

By this method of shoeing, the outer, diseased half of the foot is relieved, while the inner, sound half receives its due proportion of the body weight, and there results a uniform distribution of the weight over the shoe, a uniform wear of the shoe, and therefore perfectly even setting down of the foot in locomotion.

Where we have to do with an ossification of both cartilages a leather sole is indicated, and is to be preferred to the various rubber, felt and straw pads that are in the market and might be employed for this purpose. *It is a serious error to lower the quarters so that they will not press upon the branches of the shoe*, for though such a procedure may *temporarily* diminish lameness, the quarters being removed from the resistance of the shoe will contract all the more rapidly and the lameness will be ultimately aggravated.

Frequently, horses lame from an incipient ossification of the cartilages which cannot be diagnosed, are shod with bar shoes, and an increase in the intensity of the lameness is the usual result. The ossified cartilages cannot yield to the outward pressure of the soft frog and plantar cushion, and there is a tendency to pinch and bruise these soft, sensitive and vascular tissues whenever the weight is placed upon the foot. Therefore, a bar shoe should not be used when these tissues are inflamed. Should the presence of other foot diseases seem to require a bar shoe, the bar should not rest directly upon the frog, but should be so far from it that an ordinary straw may be passed between the two.

3423 Walnut Street, Philadelphia.

THE CASTRATION OF CRYPTORCHIDS.

By P. J. Cadiot,
Professor in the Veterinary School at Alfort.[1]

With eleven illustrations.

[Translated from the German[2] by Dr. John W. Adams.]

[*Begun in the March number.*]

II. The Belgian Method (Excavation of the Inguinal Canal and Perforation of the Peritoneum at the Upper Inguinal ring).

Anatomy of the Inguinal Region.—This region is formed by the postero-external wall of the abdomen and the inner face of the thigh, which converge toward the external angle of the ilium. Superficially it is bounded inwardly by the anterior pubic region, outwardly by the angle of the haunch, anteriorly by the inferior abdominal region, and posteriorly by the inner surface of the thigh. Deeply it is limited inwardly by the common or prepubic tendon of the abdominal muscles and the lateral border of the pelvis, superiorly by the sub-lumbar region, outwardly by the external angle of the ilium. In this region there is in the stallion a canal, which contains the testicular cord; the *inguinal canal*, which terminates in the abdominal cavity by a narrow opening, known as the *upper inguinal ring*, while its inferior end, the *lower inguinal ring*, may be easily felt, if the hand be carried above the testicle into the groin where the testicular cord enters the ventral wall. In abdominal cryptorchids the lower inguinal ring may be felt almost as easily as in normal stallions, but the canal which it usually encloses does not exist. The inguinal canal is completely filled by connective tissue. In inguinal and incomplete abdominal cryptorchids, there is formed in the deep inguinal region, by the incomplete descent of the testicle, epididymis or vas deferens, a short canal which opens above by a narrow aperture (upper inguinal ring) into the abdominal cavity, but terminates below in a blind sac, which is separated from the lower ring by a layer of connective tissue of variable thickness.

The region of the inguinal canal shows a succession of layers similar to the abdominal wall, but exhibiting special relations in the deeper parts. The layers from without to within succeed one another as follows:

1. The skin.
2. The tunica dartos.
3. Subdartoid connective tissue.
4. The great or external oblique muscle (fascia).
5. The small, or internal oblique muscle (muscular and aponeurotic portions).

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[1] De la castration du cheval cryptorchide. Par P. J. Cadiot, Professor à l'école vétérinaire d'Alfort. Avec 11 figures dans le texte. Paris, Asselin et Houzeau. 1893.

[2] Monatshefte für praktische Thierheilkunde. IV. Band. 9. Heft. Aus dem Französischen übersetzt von Professor Dr. Fröhner in Berlin.

6. The transverse abdominal muscle (fascia).
7. Connective tissue under the peritoneum.
8. The peritoneum.

The skin in the inguinal region has all the peculiarities of the scrotum in the stallion; it is fine, pliant, elastic, extensible and feels oily, almost slippery.

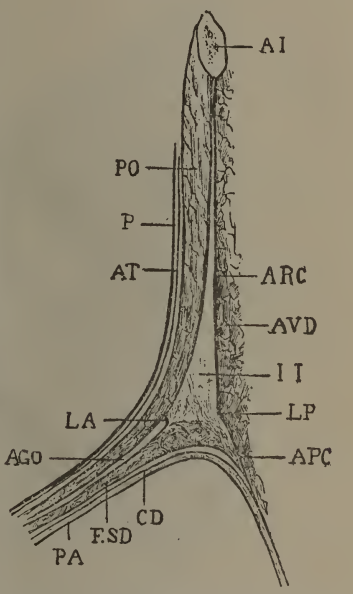
The tunica dartos is rather thick, consisting of elastic fibrous tissue. While it moves freely upon the underlying layers, it is intimately united with the skin.

The layer under the dartos is thick and composed of firm, resisting connective tissue lamellæ; it is traversed by quite large veins (prepubic), and several small terminal branches of the subcutaneous abdominal artery.

The aponeurosis of the great or external oblique muscle is composed of fibres which course downward, backward and inward. Its posterior border extends from the external angle of the ilium to the anterior border of the pubis, embraces the muscles of the thigh and separates into two fibrous leaves, of which the inferior, the *crural fascia* (Figs. 7 and 8), descends to cover the inner surface of the leg, while the superior, *Poupart's ligament*, passes upward and inward along the abdominal wall to the entrance to the pelvis (Figs. 7 and 8).

This ligament, a simple aponeurotic band, whose ends are attached to the external angle of the ilium and the anterior border of the pubis, forms the posterior wall of the inguinal canal. It covers the fixed attachments of the short adductor muscles of the leg, the femoral vessels, the long adductor and the upper part of the crural muscles. In its middle third it grows thin and is prolonged upward upon the surface of the long adductor to the insertion of this muscle, where it unites with the lumbo-iliac aponeurosis. The lower inguinal ring is in the postero-internal angle of the aponeurosis of the external oblique muscle.

FIG. 7.



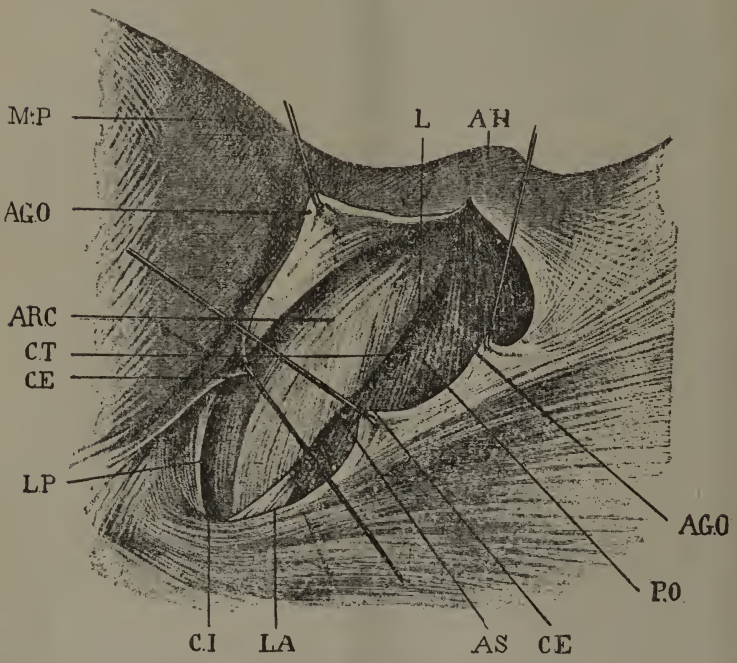
Section of walls of left inguinal canal from middle of lower inguinal ring to supero-external angle of the ilium. Inner segment.

PA Skin. *CD* Tunica dartos. *FSD* Subdartoid connective tissue. *AGO* Aponeurosis of external oblique muscle. *LA* Antero-internal lip of lower inguinal ring. *LP* Postero-external lip of lower inguinal ring. *II* Inguinal canal filled with connective tissue. *PO* Small, or internal oblique muscle. *AT* Aponeurosis of transverse abdominal muscle. *P* Peritoneum. *ARC* Poupart's ligament. *APC* Crural fascia. *AVD* Crural muscles. *AI* External angle of ilium.

The internal oblique muscle participates in the formation of the inguinal region by its posterior portion, which expands upon the lateral and inferior walls of the belly, and even passes slightly backward toward the pelvis. In this portion its fibres run obliquely upward, forward and outward; below the inner lip of the lower ring the fibres bend about and run in the direction of the abdominal wall. Their forward course is less marked the nearer to the posterior border of the

muscle we view them. This last, whose position is of the greatest importance in the operation, runs parallel to the upper border of Poupart's ligament from the external angle of the ilium to the prepubic tendon of the abdominal muscles. In its outer third it is inserted into the angle of the haunch and Poupart's ligament; in the largest portion of its expansion it lies directly upon the latter; in its short aponeurotic portion it is, however, quite free from attachments. (Figs. 8 and 10).

FIG. 8.



The right inguinal canal seen from the flank. The external commissure of the lower inguinal ring has been removed. The aponeurosis of the great or external oblique muscle has been cut through just anterior to the place where it divides into its two folds. The internal oblique muscle has been exposed to view from Poupart's ligament nearly to the inner commissure of the lower inguinal ring.

ARC Poupart's ligament. *PO* Small, or internal oblique muscle. *CT* Inner commissure of inguinal canal. *AGO* Aponeurosis of great, or external oblique muscle incised, and its edges laid back. *CI* Inner commissure of the lower ring. *CE* External commissure of lower ring, cut through. *LA* Anterior lip. *LP* Posterior lip. *AS* The dots indicate the position of the upper inguinal ring. *L* The dotted line shows the height at which the opening is made in the operation on abdominal cryptorchids. *AH* External angle of the ilium. *MP* Right hind leg abducted.

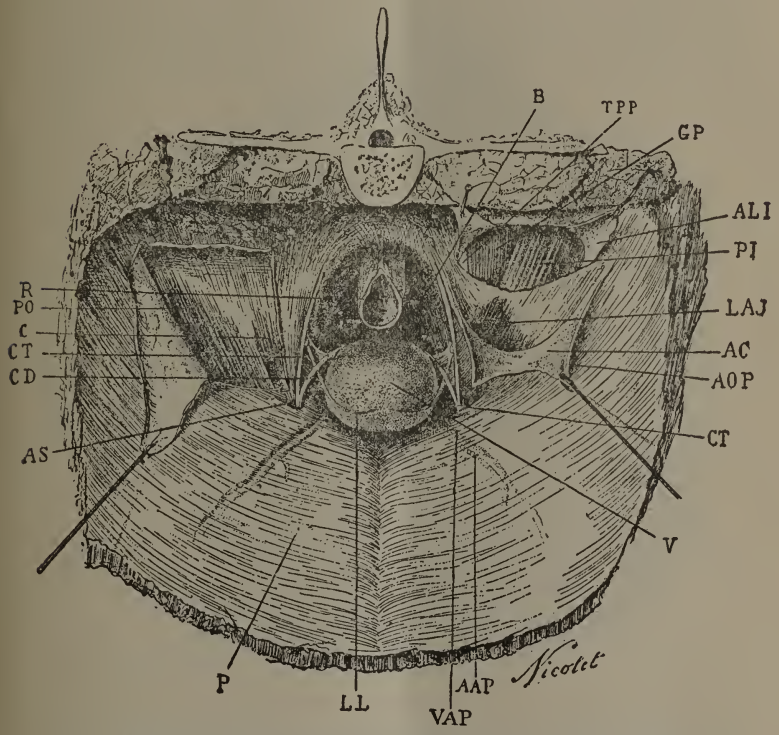
The transverse muscle of the abdomen is entirely aponeurotic in the inguinal region; it forms a thin, incomplete, non-resisting layer upon the inner surface of the internal oblique muscle.

The fascia transversalis consists here of a connective tissue membrane spreading out between the peritoneum and the aponeurosis of the transverse muscle of the abdomen.

The peritoneum, the inmost layer, is loosely attached to the aponeurosis of the transverse muscle through the medium of the fascia transversalis.

The inguinal canal, as already mentioned, is a narrow space between the internal oblique muscle and Poupart's ligament (Figs. 7 and 8). Extending downward, inward and slightly backward it exhibits:

FIG. 9.



Vertical cross section of the posterior abdominal region of a normal stallion.

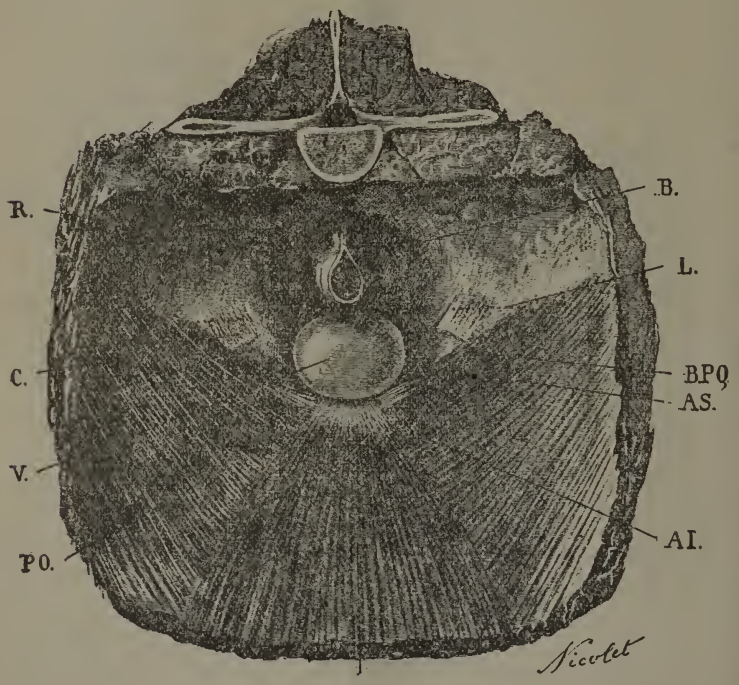
P Peritoneum. *AAP* Posterior abdominal artery. *VAP* Posterior abdominal vein. *AS* Upper inguinal ring. *CT* Testicular cord. *CD* Vas deferens. *AOP* Layer of tissue which encloses the superior border of Poupart's ligament, the posterior border of the small, or internal oblique muscle, the cremaster, the peritoneum and sub-peritoneal connective tissue. *AC* Poupart's ligament turned downwards; deep layers of the same. *LAJ* Long adductor muscle of the leg. *ALI* Lnmbo-iliac fascia. *PI* Iliac psoas muscle. *GP* Great psoas muscle. *TPP* Tendon of small psoas muscle. *B* Pelvic cavity. *R* Rectum. *V* Bladder. *LL* Lateral ligaments of bladder, with the obliterated umbilical arteries. *PO* Internal oblique muscle. *C* Fixed attachment of cremaster muscle.

1. Two walls, an anterior and a posterior.
2. Two commissures, an external and an internal.
3. A lower opening, or entrance.
4. A bottom, or point.

The anterior wall is formed by the internal oblique muscle, whose thickness diminishes toward the median line and toward the inner commissure of the inguinal canal; in the proximity of the latter, this wall is very thin, aponeurotic (Fig. 8.)

The posterior wall is formed by Poupart's ligament, which is very strong in its inferior portion and near the outer commissure, but is thinner along its upper border, where it becomes confounded with the lumbo-iliac aponeurosis.

FIG. 10.



Vertical cross section of the posterior abdominal region, showing the superior insertion of the small oblique and cremaster muscles, seen from in front. The peritoneum and transverse muscle of the abdomen have been removed.

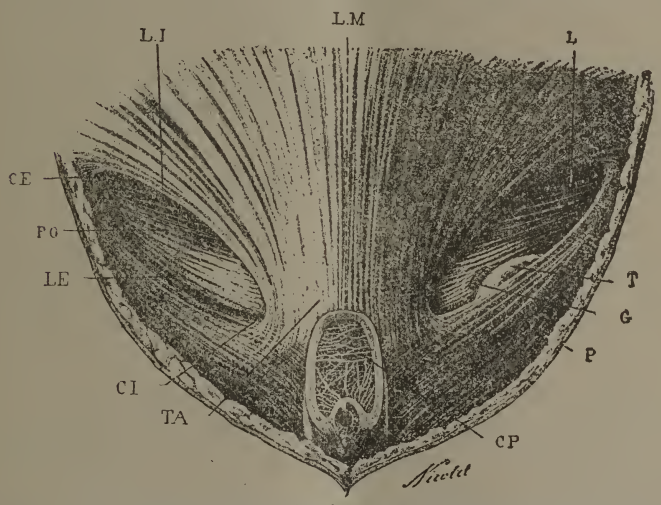
PO The small oblique muscle. *BPO* Posterior border of the same. *C* Superior portion of the exsected cremaster. *GD* Great rectus muscle of the abdomen. *AI* The dotted line indicates the position of the lower inguinal ring. *AS* The dotted line marks the position of the upper ring. *L* Dotted line shows the height at which the hand reaches the peritoneum in the operation for abdominal cryptorchidism. *B* Pelvis. *V* Bladder. *R* Rectum.

The outer commissure is formed by the union of the internal oblique muscle with Poupart's ligament. Along the line of this commissure, extending downward, inward and backward, these two tissues are more intimately united than within the canal proper; yet this commissure may be torn by the fingers, and the internal oblique muscle detached from the aponeurosis of the external oblique muscle for a considerable distance.

The inner commissure is formed by union of the same structures. It is even much less resisting than the outer, and readily tears along its entire length during an unskillful perforation of the inguinal cavity.

The entrance to the inguinal canal is the lower or *external inguinal ring.* It is oval in outline, its long diameter has an oblique direction backward and inward, and it is formed by two curved fibrous lips, which represent the bounds of the orifice. It is important to make a distinction between these two lips, borders or pillars and the two angles or commissures (Figs. 8 and 11.) The anterior lip is covered from within by the internal oblique muscle, whose fibres at this point begin to assume a more nearly horizontal direction. The posterior lip is formed exclusively by a portion of the aponeurosis of the external oblique muscle. The anterior (outer) commissure, more or less resisting in certain animals, is formed by the

FIG. 11.



Anterior pubic and inguinal regions, seen from below. On each side of the median line are seen the lower ring and the entrance to the inguinal canal.

CI Inner commissure of lower ring. *CE* Outer commissure of lower ring. *LI* Inner lip of ring. *LE* Outer lip. *PO* Small, or internal oblique muscle. *T* Testicle covered by tunica vaginalis, and descended as far as the lower ring (inguinal cryptorchidism.) *G* Fibrous frænulum, remnant of the gubernaculum. *L* The dotted line indicates the position and direction of the opening made through the internal oblique muscle in the Danish method as modified by Bang and Möller. *TA* Prepubic, or common tendon of abdominal muscles. *CP* Section of penis. *P* Skin. *LM* Median line.

diverging fibres of the aponeurosis from the external oblique muscle. The very strong posterior (inner) commissure extends to the prepubic tendon of the belly muscles and to the anterior border of the os pubis. The bottom or fundus of the inguinal canal is formed by the union of the two commissures.

Do not think that the summit of the inguinal canal, *i. e.*, the place where in the castration of abdominal cryptorchids the deepest portion of the abdominal wall is reached, lies far above the point where the normal internal inguinal ring is found. The latter is but 3½–4 inches distant from the median line, while the former is from 6–8 inches (Figs. 8 and 10.)

A knowledge of these anatomical details is very desirable for a proper performance of the operation.

Embryological investigations have proved that the *cremaster* muscle, which former anatomists considered to be a branch of the internal oblique muscle, is a special muscle, which during fœtal life is enclosed within the peritoneal fold that covers the abdominal portion of the gubernaculum. In consideration of the topographical anatomy, and especially of the operation under discussion, it is of advantage, however, to entertain the earlier view. The superior insertion of the cremaster is really so intimately related to the internal oblique muscle, that it appears to be, indeed, nothing more than the last digitation, or strand, of the muscle (Fig. 10.)

Although the cremaster is but little developed in cryptorchids, it will nevertheless be found advantageous, in order to have a definite fixed point, to regard its insertion into the lumbo-iliac fascia as the limit of the inner commissure of the inguinal canal, whose fundus would then extend from the insertion of the cremaster to the superior extremity of the outer commissure of the canal, following a line passing obliquely upward and outward. In the operation for abdominal cryptorchidism after the Belgian method, the hand must arrive under the peritoneum at any point in the inner half of this line, and, if possible, near the pelvis, where the connective tissue of the inguinal canal unites with the subperitoneal connective tissue.

Into the inguinal canal pass the inguinal nerves, the external pudic artery and the satellite veins. Toward the middle of the inner commissure, near where, in normal stallions, the upper inguinal ring is found, the prepubic artery bifurcates to form the posterior abdominal and external pudic arteries. In cryptorchids may also be found the remnant of the inguinal portion of the gubernaculum, in the form of a fibrous cord passing from the tunica dartos to the middle of the inner commissure.

General Remarks.—Degive is the annalist and advocate of the Belgian method, with which are also associated the names of Van Seymortier, Diericx, Capon, Jacoulet, Donald, Mauri and Trasbot.

Undoubtedly, the Belgian method is in all cases to be preferred.

Method of Securing the Animal. Preparation for the Operation. Instruments.—The horse is cast upon the side opposite the one in which the testicle is concealed, and is maintained in this position, except that the hind quarters are slightly elevated by placing bundles of straw underneath; or the animal may be placed in a position halfway between the lateral and the dorsal positions. The upper hind foot is either drawn forward against the shoulder, as in castration, or abducted as in the operation for "scirrhous cord," or champignon. In order to facilitate the perforation of the inguinal canal, it is advisable to flex the upper leg till it is but one-half the length of

normal extension. The twitch is put on the upper lip, and the tail held fast.

As to the necessity for narcotizing, opinions differ. A majority recommend the use of ether or chloroform ; some maintain that narcosis is superfluous and, indeed, injurious rather than beneficial (Mauri). Hence, it is evident that the question of narcosis is of secondary importance. I agree with Bang and Trasbot, that narcosis is *not* indispensable, though of benefit when dealing with very excitable animals. My procedure with it is as follows .

The upper hind foot is abducted as in the operations for "champignon," or inguinal hernia, and is held flexed in this position by means of two side-lines, of which one passes forward toward the neck, and the other toward and perpendicular to the vertebral column. Narcosis is then produced with ether. In this position of the limb I operate even at night ; the perforation of the inguinal canal is accomplished with ease, and without weariness to the hand. Before entering the abdominal cavity it is necessary that the region of operation, the operator and instruments be absolutely aseptic. Also the upper parts of the hind limbs, especially their inner surface and the inguinal region, are moistened with an antiseptic liquid to prevent contamination of the wound by dust or hair. Wrapping the upper hind leg as high as the middle of the tibia, or at least the hoof, with cloths which have been dipped into an antiseptic liquid, is an excellent preventive measure. The sheath is now cleansed and disinfected, the inguinal region thoroughly cleansed with soap, and carbolic acid in water, and rinsed with the carbolic acid solution. The instruments and materials necessary are a convex bistoury, two or three artery forceps, an ecraseur, small sponges fastened upon handles, a tampon of iodoform gauze, a needle and silk thread. The bistoury and the ecraseur are the only indispensable instruments.[1]

Operative Procedure.—This consists of four distinct acts :

1. Incising the scrotum, tunica dartos and the underlying layers.

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[1]To operate antiseptically, we need but little material : carbolic acid, creolin or corros. sublimate is sufficient. For disinfection of the seat of the operation, instruments and hands, a strong solution (five per cent) of carbolic acid or creolin is absolutely trustworthy.

For rinsing in the course of the operation, Van Swieten's solution (1 Sublimate, 100 Alcohol, 900 water) is now in general use.

2. Excavating the inguinal canal and perforating the deep layers of the abdominal wall.

3. Finding and grasping the testicle.

4. Removing the same.

First step. Incision of scrotum, tunica dartos and subdartoid layers.—The line of incision is the long axis of the inguinal ring, whose lips are easily located. With a bistoury, an incision about six inches long is made, from before to behind, through the skin and dartos. Nearly all operators recommend that the incision be made at the bottom of a crease produced in the skin by an assistant; this advice may, indeed, be of value to beginners! When the fascia under the dartos is reached, a small incision is made at the point corresponding to the centre of the inguinal ring; the thumbs, with their dorsal surfaces in apposition, are passed into the incision, and the opening is enlarged by separating the thumbs. This fascia may be divided by the knife, layer by layer, along the same line as the skin, but the bleeding vessels must be carefully ligated or twisted. By one of these two methods the outer ring is exposed.

Second step: Excavation of the inguinal canal and perforation of the deep layers of the abdominal wall.—This is the most dangerous part of the operation. Use the hand which is the more skillful; it is usually better to employ the hand corresponding to the concealed testicle, as for the right testicle the right hand and for the left the left hand. After placing the finger tips together so as to form a cone, pass the hand through the entrance to the inguinal canal, the lower ring, the points of the fingers directed toward Poupart's ligament and the elbow toward the symphysis pubis. The course which the hand should follow, has been accurately described: outward, straight toward the arch of the lumbar region, or slightly backward. With the external angle of the ilium as a landmark, push the hand with moderate force into the inguinal canal, the points of the fingers always pressing against Poupart's ligament; from this point proceed slowly, half pushing, half boring or gently spreading the fingers, and avoiding any injury to the inner commissure. In this manner without difficulty one reaches the bottom of the inguinal canal and the internal oblique muscle. At this place the posterior border of the muscle may be distinguished for a distance of an inch or more; the peritoneum can be felt, and the intestinal loops on

the other side may be recognized. Nothing then remains except to tear through the peritoneum. Usually it may be easily burst through by a strong thrust with the point of the index finger, or of the index and middle fingers. Only exceptionally is it found necessary to tear it with the nail, by seizing it between thumb and index finger. If blood collects in the inguinal canal, it is removed by aseptic pledgets of cotton or lint.

In this manner the second difficult step in the operation is accomplished. If properly done, the opening into the abdominal cavity may be made sufficiently high up to avoid every danger of hernia. If the hand follows the right course it will arrive under the peritoneum, not far from the sublumbar region, near the terminal tendon of the small psoas muscle and the external iliac artery (Degive), or more outward toward the middle of the external border of the iliac psoas muscle (Trasbot). Still other places are, near the superior insertion of the long adductor upon the lumbo-iliac fascia, and near the border of the pelvis, between the tendon of the small psoas and the middle of the under surface of the iliac psoas (Compare Figs. 9 and 10). When the animal rises to its feet the continuous pressure of the intestines against the abdominal walls presses the internal oblique muscle tightly against Poupart's ligament, the lumen of the tunnel made through the inguinal canal is obliterated, and the entrance to the abdominal cavity is hermetically closed. I repeat: the inner inguinal ring and the summit of the inguinal canal are not together; the latter is placed from four to five inches above the former (Vide Fig. 10).

The danger does not lie in the *character of the opening* into the abdomen, but in not making the opening sufficiently high up.

Perforating the abdominal wall at too dependent a point is the rock upon which the success of the operation has been so often wrecked. This can always be avoided by keeping the hand away from the inner commissure of the canal. Should the hand make a false passage ending near the pubis, separating the walls of the inner commissure too deeply, and perforating the peritoneum at this point, one would experience constant difficulty during the operation in preventing the hernia of a loop of intestine.

Third step : Finding and grasping the testicle.—If the peritoneum has been opened at the right place, pass three fingers, or only the index and middle fingers, through the opening, and, through the sense of touch, examine the parts within reach. In the majority of cases the testicle lies in this region, most frequently a little in front of and below the opening, not far removed from the ascending branch of the ilium. As a rule, one does not first encounter the testicle, but the epididymis, lower border of the suspensory serous fold of the testicle, or the vas deferens. The operator seizes between the fingers whatever lies nearest the hand, and draws it into the inguinal canal. Should he happen upon the suspensory serous fold of the testicle, he may sometimes recognize it by its pronounced inclination to descend of itself into the inguinal canal.

This marked peculiarity I learned in my second operation. I had grasped the inferior border of a much thickened testicular ligament, which I at first mistook for an intestinal loop. With the fingers alone I could not positively distinguish between the two ; however, it followed the hand into the inguinal canal so readily, that I resolved to draw it down to the lower ring : it was really the suspensory fold of the testicle, and was followed by the epididymis and testicle.

In many cryptorchids the search for the testicle is tedious and perplexing ; we may explore with the finger upward, downward, forward and backward, and feel nothing but intestinal loops. In such a case we must enlarge the abdominal opening, pass the entire hand into the abdomen, and direct it slowly toward the median line of the entrance to the pelvic cavity, or move it from within to without upon the inner surface of the abdominal wall. In doing so, we must avoid pressing with the wrist or forearm too strongly upon the inner edge of the wound, since the inner commissure tears readily and the opening may become much too large.

If the hand be impeded by intestinal loops which must be pushed aside or repelled, it will quickly become tired ; we must then, by a change of position, or a temporary cessation of effort, permit the arm to rest. In needful cases withdraw the hand carefully, using the anterior lip of the inner opening as a sort of valve ; when rested, reintroduce the hand and search further among the intestines which may conceal the testicle. But in this we must not act with undue haste or violence.

Sometimes we may search in vain for fifteen to twenty minutes, and then during or following a period of disquiet, hit suddenly and unexpectedly upon the testicle. Another procedure consists in carrying the hand to the bladder, seizing the vas deferens between the index and middle fingers and following it forward to the epididymis. However, we must not confound the vas deferens with the obliterated umbilical artery which is less movable and forms a slender cord in the free border of a fold of peritoneum passing horizontally from the fundus of the bladder to the lateral pelvic region. (Vide Fig. 6).

The gubernaculum can also serve as a guide in the search for the testicle, though it is more difficult to find than the vas deferens. In some animals all measures fail; the testicle cannot be found, or does not exist. Even Degive was, in four cases, compelled to give up the search. It must not be forgotten that in cryptorchids the size and consistency of the testicle may vary greatly. Frequently it is so small, so soft and atrophic, that even a practiced finger cannot detect it. Bang and Möller advise that the organ seized be strongly pinched; if it be the testicle, the animal will exhibit signs of unrest, even though in chloroform narcosis.

If the testicle be not over-large, it will always be found easy to draw it through the inner opening, and down through the inguinal canal to the outer ring. If the epididymis or vas deferens first enters the canal, it is seized and, by means of it, the testicle is drawn into the canal. Only in case of an unusually large testicle are there any difficulties; its passage into the canal is then not without danger. Should it be simply drawn within the canal, it would leave a large opening behind. This objectionable feature may be avoided in the following manner. While about three-fourths of the hand is within the abdominal cavity, if the back of the hand gently elevates the internal oblique muscle, the testicle may frequently be conducted to the border of the opening, and, lying in the palm of the hand, may be pressed through and into the canal, while the body of the hand acts as a guard in holding back the intestines. When fully within the canal, the fingers are slightly separated so as to dilate the passage somewhat, and the testicle is drawn slowly backward toward Poupart's ligament. The internal oblique muscle then presses closely against the latter and closes the opening of the canal.

Should the testicle at any point show peritoneal adhesions—a condition seldom seen—they may easily be broken away by the fingers.

In still rarer cases of enormous enlargement of the testicle we have from Degive two alternatives: (1) We bring the vas deferens into the inguinal canal and resect (cut away) a certain extent of it, and allow the testicle to fall back into the abdominal cavity—result uncertain; (2) When the enlargement is dependent upon a cyst, the latter is brought up to the opening in the abdominal wall and held firmly there by one hand introduced within the rectum. The other hand carrying a fine trocar is passed into the canal, the trocar is thrust into the cyst, its liquid contents escape and the testicle diminished in size is then easily drawn into the canal. If the cyst be superficial we may often tear it away, and remove the testicle without puncture. Degive and Hendrickx have reported several very noteworthy cases. It usually suffices to tear through the superficial peritoneal layer of the cyst, and leave the membrane peculiar to the cyst intact; the latter will then roll out through the tear and separate itself more or less from the testicle which, being modified in form, lengthens and under traction of the fingers passes through the abdominal opening into the inguinal canal.

If it is impossible to reach both the testicle and epididymis, we may satisfy ourselves with the removal of the former, which is sufficient. It is not sufficient, however, to remove the epididymis alone. One horse, from which on one side Nielsen removed only the epididymus, remained a stallion. Petersen, in castrating a two-year-old colt, found only the rudiment of a gland, and removed it. The animal retained the characteristics of a normal stallion. Two years later there could be felt in the scrotum a body of the size and shape of an ordinary hen's egg which was removed and found to be the testicle minus its epididymis.

Fourth step: Removal of the testicle.—This is accomplished with an ecraseur, by torsion, or by ligation followed by excision below the ligature. As a rule, the testicle permits itself to be drawn down to the lower ring; and in some animals the length of the cord is so great that it allows the testicle to reach even the upper extremity of the tibia. On the contrary, there are cases in which the testicle must be removed at a greater or less distance within the inguinal canal. Only exceptionally, however, is it necessary, by reason of unusual shortness of the cord, to carry the chain of the ecraseur into the abdominal cavity.

Where possible, employ the ecraseur, encircle the cord directly above the epididymis, and slowly crush it off, allowing intervals of about twenty seconds between the rotations of the handle. A few minutes is sufficient for the amputation. There will be little or no hemorrhage. Exceptionally, when the testicle is very large, the stump bleeds a little ; but, according to Bang, this may be prevented by applying three silk ligatures to the cord, and cutting away the testicle immediately below the triple ligation.

Dressings.—Cleanse the wound with the help of small sponges, aseptic tampons of cotton or gauze, and rinse it out with a sublimate solution. Many operators use no further precautions. Others unite the edges of the scrotal incision by silk sutures, to prevent the escape of intestinal loops which may gain entrance to the inguinal canal. With the same object in view, some operators place an oakum tampon within the most spacious portion of the canal and close the opening in the skin by a provisional suture. After twenty-four to forty-eight hours the wound is reopened and the tampon removed. If we are certain that we have opened the abdominal cavity sufficiently high up, so that the superior extremity of the inguinal canal is well closed, we will then need neither dressing nor suture. It suffices to cleanse the wound and rinse it with a sublimate solution, or powder it with iodoform. It has been equally strongly recommended to close the scrotal wound with a few sutures, placing a drainage tube in the lower part of the inguinal canal, and covering the edges of the wound with a layer of iodoform-collodion. At any rate this procedure will prevent the soiling of the wound when the animal is in the act of rising to its feet.

If there be reason to expect the appearance of an intestinal loop within the inguinal canal, take a piece of carbolized or iodoformized gauze, fold it together several times so as to make a flattened tampon, fasten a string to it, and place the tampon within the lower part of the inguinal canal. In doing this use care not to place it so high as to interfere with the formation of adhesions between the internal oblique muscle and Poupart's ligament. Then unite the edges of the skin wound by five or six interrupted silk sutures, cut the string from the tampon at a distance of two or more inches below the skin, and cover the line of sutures with a layer of iodoform-collodion. If an error

has been made in perforating the wall of the inguinal canal, allow the tampon to remain from twenty-four to thirty-six hours. I can vouch for the good results of this procedure in several operations.

If in a monorchid the testicle which is down has not been removed, castrate in the usual manner, after the first operation is ended. Some veterinarians, among them Bang, remove the descended testicle first; the animal is then less restless during the removal of the ectopic testicle.

In double cryptorchidism many practitioners remove both testicles at the one operation—one immediately after the other. In some horses with long testicular cords both testicles may be removed through one and the same opening, if the hand be passed into the abdominal cavity (Möller). As a rule, however, the operation should be performed at two different times, with an interval of several weeks.

When the horse has been released, allowed to rise quietly, and returned to his stall or box, he should be placed in the slings for twenty-four to forty-eight hours, and given half rations for four or five days. Bang advises that no straw be put in the stall. Degive and Jacoulet, on the contrary, recommend that straw be piled up under the hind feet, so as to elevate the hind quarters and cause the abdominal viscera to gravitate forward. The hair of the tail should be plaited and held to one side. Winter places the patient in a box-stall without slings, or allows him to go immediately upon the pasture. During the warm season, green food is of advantage (Bang).

When the sutures and dressing have been removed, the wound should be cleansed thrice daily by antiseptic irrigation, and covered with iodoform or iodoform-tannin (1 : 4–5). The wound may be advantageously rubbed with carbolic, creolin or iodoform-salve. Cicatrization follows a varying course. The inner opening, and the upper portion of the inguinal canal heal by first intention; the lower portion by second intention or granulation. Frequently the suppuration is quite scanty; sometimes even almost none. The accumulation of secretions within the inguinal canal may be prevented by daily opening the scrotal wound before the first injection is made. The complete healing of the wound requires from three to five weeks.

From the eighth or tenth day after the operation the animal should be exercised somewhat; and toward the close of the third week he may be again put to work.

III. The Danish Method.

This method has been described by Stockfleth and modified by Bang; Nielsen, Möller and a great many Danish and German veterinarians employ it. It comprises the perforation of the abdominal wall near to the lower inguinal ring, or of the internal oblique muscle at the entrance to the inguinal canal, the seizure of the testicle, and its withdrawal from the abdomen through the opening made. Preparation and securing of the animal, cleansing of the inguinal region and the securing of antisepsis are quite the same as in the Belgian method. The operation consists of four stages:

1. Incising the skin, the dartos and the subdartoid connective tissue.
2. Perforating the abdominal wall.
3. Searching.
4. Removing the testicle.

For the peculiarities of procedure refer to the article by Möller, entitled, "The Castration of Cryptorchids," which appeared in the *Monatshefte für Praktische Thierheilkunde* (Vol. I., 1890, page 385).

B. Operative procedure in inguinal cryptorchidism.

Operative Technique.—In a majority of cases the removal of the testicle in inguinal cryptorchidism is but little more difficult than an ordinary castration. The manner of preparation, securing, etc., is the same as for the operation of abdominal cryptorchidisn by the Belgian or the Danish method. The operation comprises four steps:

1 Incising the skin and dartos, and tearing through the underlying connective tissue.
2. Isolating the vaginal sheath.
3. Opening the same.
4. Removing the testicle.

The first step is executed as in the operation for abdominal cryptorchidism.

Second Step : Isolating the Vaginal Sheath.—After exposing lower ring, make an opening into the canal, by tearing the connective tissue as in the third step of the operation for abdominal cryptorchidism. Usually, the operator will then come upon an egg-shaped mass: the testicle and its serous coverings (Fig. 11). The testicle is loosened by torsion produced by the index and middle fingers, which are partly flexed so as to form a hook. The fingers also tear away the connective tissue which unites the vaginal sheath to the walls of the canal. It is seldom necessary to employ a knife for this purpose. Should the testicle rest deeply within the canal, it will be possible, at least, to isolate its serous envelope by using the index finger. Advance with caution, however, and avoid all deviation toward the internal oblique muscle and the inner commissure.

Third Step : Incising the Tunica Vaginalis.—If the testicle lie in the outer portion of the inguinal canal, hold it fast with one hand and open the vaginal sheath with a knife, as in castration. If it lie deeply within the canal, grasp it with two fingers and draw it down till its envelopes can be easily incised. Should it offer resistance, seize it with long forceps and draw it forcibly downward. Sometimes the knife must be introduced within the canal.

In incomplete abdominal cryptorchidism (see page 192,) where the vaginal sheath encloses only the epididymis or a portion of the cord, the testicle when small may be drawn down by traction upon these appendages ; but when large may be unable to pass through the inner inguinal ring. The operation is then more difficult, for it is then necessary, either to widen the canal by incising the vaginal sheath throughout its entire length and dividing the inner ring toward its outer commissure with a probe-pointed bistoury, as Möller has twice done successfully, or, what is probably safer and more worthy of recommendation, to operate as for abdominal cryptorchidism. Sometimes the tail of the epididymis may be mistaken for an atrophic testicle. My previous remarks, and a single glance at fig. 5 should be sufficient to prevent this errror.

Fourth Step : Removal of the Testicle.—When the cord has been exposed, remove the testicle by torsion, or by the ecraseur, placing the chain immediately above the epididymis. Or a tight silk ligature may be placed on the cord, and the testicle

cut away below the ligation. Ordinarily, cleanse the wound with a sublimate solution, dust it with iodoform, and unite the edges by several sutures. If it has been necessary to perforate the abdominal wall, use in addition those precautionary measures employed in the operation for abdominal cryptorchidism. After twenty-four hours loosen the sutures, tie the animal short so that he cannot lie down for one or two days, allow him to rest for one or two weeks, and cleanse the wound frequently with antiseptics.

Undesirable sequelæ of the operation.—These are, in all animals operated upon through the inguinal canal, assuming that the wound closes properly, about the same as those following an ordinary castration. In many horses are observed symptoms of colic which soon disappear. If rigid antisepsis has been observed the inflammatory and febrile reaction will be insignificant and the wound will heal without suppuration. More frequently, however, the wound and sheath of the penis swell. In such a case it is important to prevent the accumulation of pus. In a horse operated upon by Lanzillotti, there developed in front of the wound a large abscess, but with no evil effects. Knife or actual cautery should be used only when the swelling is very large, and widely extended. So long as it does not extend above the perinæum and buttocks it is sufficient to irrigate the wound frequently with antiseptics, being careful not to wound or infect the granulations.

Percentage of Mortality.—The loss varies according to environment, the prophylaxis observed and the skill of the operators. Before antisepsis was practiced it was greater than to-day. Hering estimated the mortality at thirty per cent; but including the numerous fatalities that were kept secret, the loss was greater than the number of successes. The laparotomists have published so few results that no conclusion as to the worth of the flank operation can be drawn. The only figures published differ widely. While Jörgensen out of fourteen cases had fourteen successes, other practitioners state their loss to be about fifty per cent. The Danish method seems to yield the greatest variation in results. C. Jensen has castrated every year since 1860, a large number of cryptorchids with a very insignificant loss. Petersen reports from fifty operations a loss of thirty-seven per cent. Stockfleth, (fifty-six cases) puts his mortality at thirty-five per cent, Nielsen at seventeen per

cent, Möller at sixteen per cent. Other veterinarians had more favorable results. Petersen lost from thirty castrated horses only one, (three per cent); R. Jensen from 100 only three; Bang from sixty-six only one, (forty-nine abdominal, and seventeen inguinal cryptorchids, four of the latter being double). Winter, who castrates annually 100 cryptorchids, gives his loss as one per cent; many years he has had no loss. By the Belgian method Seymortier lost an eighth part of his cases (twelve per cent), Degive from 127 lost nine (seven per cent). Of operations performed in the country Degive records two series of 120 and 150 cases without a single bad result. From thirty-six horses Stelkins lost eight (twenty-two per cent), Donald from forty-six lost but one (two per cent), Mauri and Trasbot from eleven and fourteen respectively, lost none.

Complications.—Besides the numerous undesirable sequelæ that may follow this operation in common with any deep wound, there are three serious complications to be considered: intestinal hernia, septicæmia and peritonitis.

1. Intestinal hernia. – The possibility of this serious complication should be borne in mind by every one who opens up the inguinal canal. Usually, it is a loop of small intestine, sometimes the omentum, very seldom the colon, which escapes. It has been demonstrated, that the danger does not lie in the act of opening the abdominal cavity, but in opening contrary to carefully prescribed rules. By the Belgian method a hernia may be feared, if the opening through the peritoneum is either too large or located too deeply. By the Danish method there is less cause to fear this complication than was formerly supposed. The opinions of R. Jensen, Winter, Bang and Möller upon this point are very interesting. Only when the abdominal opening is wrongly placed, and the muscle is torn across the course of its fibres, does this accident happen. Sometimes the intestine appears during the operation, before the testicle has been reached; sometimes it is first seen below the wound after the animal has risen, or a few hours, or a day later.

Should the hernia occur during the operation, the loop of intestine must be replaced, to accomplish which it may be necessary to put the animal in the dorsal position; then resume the operation, remove the testicle, cleanse the wound thoroughly, pack the inguinal canal with aseptic gauze tampons and suture the edges of the skin. After reduction of the

hernia we may also close the lower ring with three silk sutures (Degive), by suturing the anterior and posterior lips, using a well curved needle. Should the hernia happen after the animal rises, or for the first time during the succeeding twenty-four hours, remove the dressing and replace the intestine within the abdomen as previously described, having previously thoroughly disinfected it ; even in the most serious cases there is some prospect of ultimate recovery. Even after very imperfect disinfection, animals sometimes recover nicely. By the Danish method, after replacing the intestine, the wound in the muscle must be sutured, or a peritoneal suture employed (Bang).

2. *Septicæmia.*—This complication is all the more serious, as it affects a region full of peculiar anatomical relations and intricacies. It is usually rapidly fatal. Prophylaxis is all important.

3. *Peritonitis.*— This, like septicæmia, is of infectious origin, and may be caused by various microörganisms. The infecting material is usually carried into the abdominal cavity upon the fingers ; in other cases an infectious inflammation near the outer wound follows the serous membrane inward to the peritoneum. The acute septic form can cause death in a few days ; as a rule, it happens in about a week. In chronic cases death may be delayed from one to two months.

A reliable treatment for this form of peritonitis is, at present, not known. It goes on to a fatal termination in spite of all medicaments. The most reliable treatment consists in the administration of calomel, antiseptics and stimulants. Rigid prophylaxis prevents this peritonitis ; that is, antisepsis before and during the operation.

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LAMENESS RESULTING FROM PARALYSIS OF THE SUPRA-SCAPULAR NERVE.

By Veterinarian Kattner.

In Vol. 31., of the *Magazine für die gesammte Thierheilkunde*, K. Guenther, published a paper on "True Shoulder Lameness in the Horse," or paralysis of the nervus supra-scapularis, in which he said that "the literature up to date, *i. e.*, 1865—on shoulder-lameness is very weak and it is apparent that the authors do not thoroughly understand the nature of the trouble," and "that therefore every contribution will be quite welcome which will tend to elucidate this condition." Later, Moeller (*Archiv für Wissenschaftliche Thierheilkunde*, 1875) mentions the same lameness in a paper on lameness resulting from paralysis of nervus radialis, stating that "the lameness of the supra-scapularis described by Guenther bears a considerable resemblance to radial nerve lameness." In the second volume of the same archiv (1876), Moeller speaks of the "nerve lamenesses in the horses," which were seen in the Berlin clinic from December, 1874 to 1875. Moeller states that the symptoms in three cases of supra-scapularis lameness were identical with those described by Guenther; during every strain put upon the fetlock the scapula was displaced in a forward and outward direction. Although we are better versed in nerve lamenesses than we were twenty-five years ago, thanks to the valuable papers by Moeller and K. Guenther, yet, in view of the variety of supra-scapular lamenesses, this contribution may prove to be of interest. I will therefore describe a case which came under my notice last summer, which will prove all the more interesting as a complete cure was effected, after which the patient again did service as a cavalry-horse.

On the fifteenth of July, 1890, a ten-year-old horse ran away with his rider, during which the animal's shoulder came into very forcible contact with the corner of a house, in consequence of which he immediately went lame. As it was thought that the animal would be incapacited for work for a long time, he was sent back by rail to his regiment. The examination after his arrival revealed the following conditions:

At rest the animal placed weight equally on all four limbs. The structures surrounding the shoulder-joint were intensely swollen, painful and abnormally warm.

In backing or going forward the right fore leg was scarcely raised from the ground, but dragged so that the foot left a perceptible track in the sand.

When the leg was carried forward by the horse, either voluntarily or otherwise, an equal amount of weight was placed upon it, but only so long as the limb was anterior to the shoulder-joint; the moment the body was propelled forward so that the foot and shoulder were in a vertical line, in other words, when the entire weight was thrown upon the limb, the scapula was displaced in an anterior direction, but returned to its normal condition when the weight of the body was again removed from the limb. Neither fracture of the bones of the region, nor rupture of the muscles or tendons could be ascertained.

The diagnosis was shoulder lameness (bruise of right shoulder), resulting from paralysis of the nervus supra-scapularis dexter.

The *prognosis*, in regard to duration of trouble and termination of nerve paralysis was doubtful. Primary treatment was applied with the idea of getting rid of the swelling and tenderness of the parts. It consisted in fomentations and stimulating applications. After two weeks the swelling, tenderness and heat of parts disappeared; in eight days the dragging movement of the leg, and in three weeks the lameness previously occurring during suspension of the limb had also disappeared. On the other hand, the lameness occurring during support of the limb persisted and even increased in severity after the swelling had left the shoulder, particularly as at this time the muscles of the shoulder were rapidly becoming atrophied. The nerve paralysis was treated by subcutaneous injections of veratrin, but during fourteen days of this treatment not the slightest benefit was noticed. The muscles had

atrophied to such an extent that the supra and infra spinatous muscles were but shreds. The chances of effecting a cure appeared to be very small indeed, as the muscular atrophy gradually increased.

The veratrin injections were discontinued, and cold water douches given instead. During the first five days of treatment the douches were applied with a large rectal syringe; five men, each one of whom was armed with a syringe, applied the douches for fifteen minutes at a time. On the sixth day a *small fire engine* was substituted for the five men, and the water applied for fifteen to thirty minutes at a time. To prevent alopecia the parts were thoroughly dried and covered with woolen sheets after the treatment. The results of this treatment were beyond all expectations; soon the animal showed marked signs of improvement, and on the twenty-fifth of September evinced no soreness or lameness while being trotted. It had been led to halter for fourteen days, then given walking exercise for eight days with man on his back and, finally, was exercised under saddle at a trot. The muscular atrophy was treated daily with massage *à tapotement*, which consists in *slapping* the parts with two small ladles or mallets, under which it gradually improved. On the fifteenth of October the animal was dismissed from the hospital and put to work as cavalry horse. Up to the end of February he was used as before the accident, but the muscular atrophy had not entirely disappeared. This case shows, that after long duration of this disease a cure may be effected.

Guenther remarks that "in mild cases the prognosis is favorable, severe cases however are incurable, as experience has shown." The time required to effect a cure Guenther claims to be from eight days to six weeks, but he mentions a case which had been cured after three months. This, according to Guenther, is the exception, and he ascribes the cure to the continual administration of veratrum album, in almost toxic doses, and external application of cantharides and tincture veratrum album. Guenther says, however, "that the safest plan is to use inunctions from the start, in connection with internal antiphlogistic treatment," and states further that "when the trouble reaches the chronic form treatment is of no avail."

Of the three cases recorded by Moeller in the Archiv, Vol. II, but one was cured. The first "rather mild case of eight to

fourteen days' standing, in which no muscle atrophy existed, was cured in two weeks, the other two cases—one of three weeks' duration with slight atrophy, the other of six weeks' duration with very pronounced atrophy—did not respond to the faradic current, so that the induction current was entirely without effect upon the atrophied muscles."

Statistics show that supra-scapular lameness is one of the rarest diseases. Including 984 patients which were under treatment at the close of 1881, there were treated 105,970 army horses from 1882 to 1889. Among this number there were 259 cases with nerve paralyses, but not a single case of supra-scapular paralysis. Evidently the paralyses were of the facial, crural and radial nerves.

In the hospital clinics at Berlin School 28,186 cases were treated from 1875–90. Among this number there occurred sixty-seven nerve paralyses, of which ten were supra-scapular, twenty-three radial and seventeen each facial and crural. Of the ten supra-scapular cases, three were cured, three somewhat relieved and four incurable. The ten cases were distributed very irregularly over the fifteen years: three were treated in 1875, two (brachial) 1884–85, two in 1886–87, and one each in 1887–88, 1888–89, 1889–90. Among the 62,616 patients examined in the polyclinic at the Berlin School during the same period, but one case of supra-scapular lameness was seen (1876). There were 138 cases of nerve paralysis: thirteen radial, 114 facial, one supra-scapular, five crural, three tibial and two sciatic.

Guenther has proved by post-mortem examination that the lameness under discussion is really due to paralysis of the supra-scapular nerve. Guenther remarks, "The nerves and blood vessels of the parts did not clear the matter up, as they were not examined * * * The supra and infra spinatous muscles, and the long and short extensors and subscapularis were excessived atrophied, pale, soft; normal contractility was absent, in fact it was a picture of that peculiar atrophy which is only seen after an old nerve paralysis, as in the atrophy of roaring, patellar trouble, and after experimental section of motor nerves. This form of atrophy has nothing in common with the atrophy of spavin, etc." Later, Guenther also studied the changes in the nerves. He remarks: "The nerves were more or less perceptibly atrophied and showed signs of

inflammatory changes." Further he made section of the supra-scapular nerve and produced a lameness very similar to that described in the fore part of this paper."

If on the one hand we take into consideration the results of Guenther's experiments, and on the other the singular fact that nerves imbedded in inflamed tissues usually remain intact, we are justified in assuming that in this trouble we have to do with an independent nerve inflammation resulting from lesions and accompanied by secondary atrophy. In this form of atrophy regeneration may take place, starting centrally in the axis cylinder. The immediate cause of supra-scapular lameness is traumatism. Injury to this nerve results in a paralysis of the supra, infra, and subscapularis, and the long and short extensors.

Hertwig (*Chirurgie*, 1874) is of the opinion that injury to the muscle, as a bruise or laceration, may produce the symptoms which we ascribe to nerve paralysis. True paralysis, he states, rarely occurs, and is recognized by complete relaxation of the muscles, and the absence of sensibility. Hertwig, however, fails to mention the cause of the trouble. The *diagnosis* and *prognosis* of this affection depend upon its duration, the degree of lameness and the secondary symptoms.

In regard to the *treatment*, Guenther recommends antiphlogistic treatment. Sharp blistering may in some cases be of benefit, but I fear that in the majority of cases such treatment is waste of time. Internal antiphlogistic treatment is to my mind useless. Better results are to be expected from the electrical treatment of Moeller. The douche I can recommend above all other treatments; it acts as an efficient nerve stimulant, and the larger and more powerful the stream of water applied the better are the results. If another case of this kind should come under my care I would immediately resort to the douche and would locally stimulate the nutritive changes of the parts by energetic massage.

TOXIC EFFECTS OF THE BLOOD AND ITS ELEMENTS IN A NORMAL AND A PATHOLOGICAL STATE.

By M. E. Leclainche and M. Remond.

[Translated from the *Revue Vétérinaire*, by S. J. J. Harger.]

The blood as a tissue, as well as the serum and the blood-clot studied separately, after removal from the veins, possess toxic properties which vary considerably according to the species of the animal. In order to simplify the conditions of the experiments we have taken as the animal of experimentation the gray rabbit, aways selecting as nearly as possible animals of the same age and weight. We have injected the liquids into the marginal vein of the ear with a speed of ten cubic centimeters per minute.

Finally, we have calculated, following the formula of M. Bouchard, the toxic action of the liquids which we have employed for one kilogramme of weight of the reacting animal.

I. From the first series of experiments we have established the following means for the toxic effects of the serum :

ANIMAL.	SERO-TOXIC COEFFICIENTS.
Horse	119
Rabbit	87
Pig	40
Dog	38
Ass	26
Sheep	25
Man	23
Cat	23
Cow	22.5

In a second series, we have proved that the triturated clot furnishes a liquid of greater toxic properties than the serum :

ANIMAL.	TOXIC COEFFICIENT OF THE CLOT.
Horse	26.4
Sheep	15
Cow	13.8
Ass	12
Rabbit	7.1
Man	7
Pig	6
Dog	5

By triturating the clot in the serum itself, so as to obtain a mixed liquid which represents the two products studied above, we have obtained the coefficients that represent the total toxic effects of the blood, excepting, of course, the filaments of the fibrin:

ANIMAL.	HÆMATO-TOXIC COEFFICIENTS.
Horse	34
Sheep	21
Cow	21
Dog	15
Ass	9.8

This difference is not the result of a mere addition to the serum of red and white blood corpuscles. The coagulum plays an important role in the respective toxic properties of each of the liquids used above when they are mixed. In fact, the toxic coefficient of the defibrinated blood of the horse is 86.3 instead of 34, and, besides, the conditions under which the clot is formed play an important role. Thus, if the coagulation of the blood of the ass be retarded we will have instead of these coefficients: Serum 26; clot 12; the following figures: Serum 50; clot 6.

The variations of the two liquids are in inverse ratio.

The rapidity of the intra-venous injection considerably modifies the result. The animal succumbs so much more slowly as the quantity which is injected is smaller.

The animal experimented on dies with phenomena which vary with the nature of the liquid employed. Thus, in some cases the symptoms are exaggerated reflexes, myosis, mydriasis, opisthotonos and general tetanic muscular contractions; in others, there is increasing dyspnœa, irregular respirations; convulsive inspirations and often cries precede death; in still others, extremely violent convulsions, rotation of the eye-balls, and in all cases, exophthalmia are seen. These phenomena are the true result of a true intoxication and we have never found true thrombi nor emboli in the subjects of experiment.

II. When the blood employed in the experiments was obtained from animals suffering from a febrile condition or any cachexia whatsoever the results obtained showed considerable variations.

The normal coefficients for the blood of the horse are as follows: Serum 119, clot 26.4, total blood 34.

In glandered animals, in which intense fever was produced by the use of mallein, the following coefficients resulted: Serum 61, clot 2.66, total blood 8.2.

The serum of a dog affected with cancer gave the following figures: Clot 20; instead of the normal coefficients: Clot 38.

The total blood of a cow affected with peripneumonia furnished a liquid which killed a rabbit in the ratio of 9 cc. to to 1 kilogramme of weight, while the same product from a healthy cow, the ratio was 9 cc. to 24 kilos.

These variations enable us to show some interesting facts from a point of view of general pathology. Other conditions may diminish the toxic properties of the liquids which we have studied.

For example:

Dog. Anæmic.—Red corpuscles, 3,400,000, white corpuscles, 65,000. The toxic ratio of the clot was six instead of five, the normal figure.

III. From another point of view it has seemed interesting to us to know the effect of a physiological solution of chloride of sodium upon the liquid furnished by the clot. We have proved that almost immediately afterwards, in one or two minutes, this liquid after the addition of salt loses a considerable part of its activity. For example:

	CLOT PLUS SOLUTION OF SALT.	CLOT (PURE).
Rabbit	28	7.6
Dog	13.9	5
Pig	12	6
Man	10	7

Here, allowance has been made for the dilution of the liquid injected.

The same phenomena are observed in a pathological state: Clot plus solution salt, clot 2.66, glandered horse 5.97.

CLINICAL REPORT.

FIBRO-SARCOMA ON THE PYLORUS.

Subject.—A bay filly, two years old, well bred and promising great speed. I saw the filly first when she was brought from the country. Her appearance then was emaciated, with a long coat, and she did not seem to have any ambition. About a month or six weeks after being brought home she was taken sick. A veterinarian was consulted who diagnosed the case as paralysis of the bowels. Being in the neighborhood very often, I was invited by the doctor to look at her. The symptoms at that time were very marked: Abdominal pain, lying down, rolling, looking around at the sides, getting up, groaning and suffering extreme pain; temperature 102° F.; pulse 50, resp. 25, and no peristaltic action of the bowels. The treatment then given was one pint of linseed oil, with the following prescription: ℞ Fld. ext. cannabis indicæ, tinct. nuc. vomicæ, tinct. opii, ether sulphuric, āā ℥i. Gave ℥ss every hour; also mustard to the abdomen.

Morning of next day no improvement; temperature 103, pulse 45 and weak, resp. 28. The following was given: ℞ Tinct. nuc. vomicæ, tinct. digitalis, fld. ext. cannabis indicæ. M. Tablespoonful every three hours.

In the evening of same day the animal was pronounced incurable. Next day the animal was apparently stronger and I suggested giving a mixture made from whole flaxseed and brandy, eggs and milk. After giving this, the pulse became stronger and there was less abdominal pain and suffering generally. There was no movement of the bowels for three days. I gave an injection of glycerine, followed by an immediate expulsion of fæces. Continued with the above treatment for three or four days, and the animal apparently recovered; advised the owner to continue the flaxseed mixture in all feed, and the animal continued to thrive on this treatment; but, if the flaxseed was omitted from the feed, the animal was sure to have colicky pains. I diagnosed the case as some organic trouble, probably a tumor. October 23, 7.30 a. m., I was

called to attend the filly, she having another attack. On arriving at the stable found the animal in the following condition: Severe abdominal pain, ears and legs cold, considerable flatulence, cold sweats bedewed the whole body; temperature 96, pulse imperceptible, resp. 30; no peristaltic action of the bowels.

Diagnosis, obstruction in the alimentary tract. Prognosis, death. Animal died at 8.30 a. m. Made a *post-mortem* with the following results: In the abdominal cavity I found a large tumor attached to, and completely surrounding, the pylorus and closing the latter so much that only thin liquids could pass through the opening. Weight of tumor five and one-half pounds. Found all the other organs in a normal condition. The tumor, examined microscopically by Dr. Robert Formad, proved to be a fibro-sarcoma, similar to the intra-peritoneal sarcomas found in man.

JAS. T. MACANULTY.

ABSTRACTS.

LARYNGOTOMY.

M. Wiart reports a case of laryngotomy (arytenectomy) performed on a horse affected with roaring, which subsequently entirely disappeared, resulting in a good recovery.

In consequence of the operation, there was great difficulty in swallowing solid and liquid foods, which passed out through the laryngeal opening; little by little the deglutition became normal. These phenomena were due to the fact that in the excision of the cartilages the ary-epiglottic fold was infringed upon and thus favored the passage of the aliments into the larnyx.—*Revue vétérinaire.*

ACTION OF TUBERCULIN AND MALLEIN UPON THE SWEAT GLANDS.

MM. Cadiot and Roger have injected horses and cats, animals which perspire readily, with mallein, and made the following observations: Tuberculin has no appreciable action upon the sudorific glands. Mallein in the horse and the cat produces diaphoresis of persistence and abundance in proportion to the dose that is injected.

Its action is not attributed to the hyperæmia, but to a direct action upon the nerve centres; section of the sciatic nerve in the cat is followed by arrest of the perspiratory secretion below the point of section.—*Recueil de Médecine vétérinaire.*

ANATOMO-PHYSIOLOGICAL STUDY OF A PECULIAR HYBRID.

A female, the issue of a Barb horse and a female mule, resembled in external conformation, the mare, and did not show any characteristics that would lead the observer, not knowing her ancestry, to surmise her pedigree. The animal, sixteen years of age, was carefully examined, during life, from

a physiological point of view and afterwards carefully dissected. She resembled much more closely the equine type than the asinine species, and showed only three peculiarities in the anatomical organization relating her to the latter: 1. A thick sub-peritoneal layer of adipose tissue; 2. an almost fully-developed cubitus; 3. a laryngeal and hyoid arrangement of the asinine type.—MM. Carnevin and Labre.—*Journal de Médecine vétérinaire, Recueil de Médecine*, etc.

THE TREATMENT OF SATURNISMUS (LEAD-POISONING) WITH SULPHURET OF SODIUM.

The author has shown by numerous experiments that sulphuret of sodium gives excellent results in acute lead poisoning. Experiments on dogs have demonstrated that this treatment is equally effective in cases of chronic poisoning with this metal.

The brain and liver of dogs poisoned with lead and treated with this soda salt for several days only showed *traces* of lead, while, in dogs poisoned in the same manner and not treated, these organs on the contrary contained a considerable quantity of the metal. The sulphuret of sodium therefore eliminates the lead from the organism. The autopsy showed the liver of animals not thus treated to be fatty, and to have a necrotic aspect on its surface; while in those dogs which had been treated with the sulphuret of sodium the liver presented only small foci of fatty degeneration, its surface otherwise having a normal color. The treatment seems to have arrested the progress of the morbid process.—Dr. J. Peyrou, *Comptes rendus* de la Soc. de Biol.—December 2, 1893.

RESEARCHES UPON THE FECUNDATION AND GESTATION OF THE MAMMIFERA.

Conclusions. 1. The uterus of the female rabbit or guinea-pig separated from the male for fifteen days ordinarily contains several non-fecunded ova. These ova transplanted from the uterus upon a plate of glass are capable of fecundation, and their proliferation, according to the author's experiments, is arrested at the eighth cycle of segmentation.

2. The ova, fecunded outside of the body and placed within the abdominal cavity of a female of the same species, continue their development. The author has destroyed the animal about the seventh day and found the embryo in the stage of the formation of the primitive line.

3. The ova, fecunded outside of the body and transplanted within the abdominal cavity of a male of the same species, continue their evolution and arrive at the same stage as in the preceding case.

4. The ova fecunded outside of the body and transplanted within the abdominal cavity of an animal of a different species also continue their development. Experiments were made upon the rabbit and the guinea-pig.

5. The author has produced extra-uterine pregnancy in mammals by removing the Fallopian tubes in females, which afterward had sexual intercourse with the male, or by injecting the semen into their abdominal cavity.—M. J. Ononoff, *Comptes rendus* de la Soc. de Biol, July 14, 1893.

ACUTE INFECTIOUS OSTEO-ARTHRITIS IN YOUNG GEESE.

This disease, very often fatal, frequently results in serious losses, and generally occurs in an epizootic form. It assumes two forms: the acute, progressing rapidly and terminating fatally; the other, subacute and less fatal, produces a cachectic state and retards growth and fattening.

The *acute form* is characterized by a decided elevation of the rectal temperature, droopiness, diarrhœa, and more or less marked lameness; station becomes impossible; the animal lies down, rests the bill on the ground, and finally dies in from one to three days.

The *subacute form* is the more frequent. The symptoms are droopiness, diarrhœa, elevation of temperature and lameness. The articulations, especially the tibio-tarsal, are hard, hot, swollen and painful, and their movements are at times very limited; walking and standing are difficult, and the animal constantly lies down to die finally of inanition. In some cases the symptoms gradually ameliorate and recovery follows, accompanied often by anchylosis of the articulations, especially of the wings and feet, leaving the animal in a crippled condition.

Acute osteo-arthritis is accompanied by lesions not very characteristic: the blood is black, the spleen and liver enlarged, the epiphyses of the bones, the ligaments and the synovials congested, and the bone marrow red; the blood contains the microbe characteristic of the disease.

In the subacute form the lesions are more pronounced; epiphyseal ostitis, violent inflammation of the articulations, and sometimes suppuration.

The system is invaded by a microbe one micro-millimetre in diameter, spherical, isolated, united in chains or in groups, and growing at 37° C. in gelatin or in veal bouillon. The microbe injected into the veins of adult geese, reproduces the same disease which rapidly has a fatal termination; injected into the subcutaneous tissue, it produces no results.

The microbe in question is the *staphylococcus pyogenes aureus*, the proof of which statement has been furnished by the experiment of M. Lucet. He has produced the disease in a goose by inoculation with this staphylococcus obtained from the pus of a furuncle in man.

The ætiology of the disease is still a little obscure. The author has not been able to demonstrate the mode of the infection of the organism, but assigns to the physiological congestion of the extremities of the bones of young animals the cause of the localization of the microbes at that point, in view of the transformation of the cartilage of conjugation and the soldering of the epiphyses.

The treatment is principally hygienic, such as abundant alimentation, healthy surroundings, well lighted and sanitary habitations, especially for the young, and, finally, careful disinfection wherever the diseased animal has been.—M. Ad. Lucet, *Recueil de Médecine Vétérinaire.*

OUR CRITIC.

VETERINARY MEDICAL ASSOCIATIONS.

Veterinarians are surely by this time old enough to judge and gauge the value of a State Veterinary Medical Association or Society, to themselves and to the profession generally, and to be able to govern themselves accordingly, without needing the stimulus of an article in the MAGAZINE to draw them out of their apathetic mood.

Once a year surely, the members of any society should put in an appearance to elect officers for the current year, if the society be worth "the keeping up."

One fact remains, which is solid, and this fact is that at this present time the veterinary profession is entering into *adult life*, its babyhood has long since passed away, and it has now to assume *toga virilis*.

Many members have seen that this is so and have been on the alert, ever active in body, mind and purse.

Earnest zeal must develop at once; that is, if it is intended to have the position for the veterinarian which his education entitles him to, for new laws are being made effective in the inspection of meats and milk, which inspection should be intrusted to the veterinarians, and will be, if they will only show a true front of competency for these duties; if they do not, the medical profession will be appealed to, and then—well, those who have worked alone will be charged with the failure by those who have neglected duty.

Professional brotherly regard and esteem, if love cannot develop, must exist, or members cannot attain public esteem and confidence.

Mutual improvement will develop by a punctual attendance at these gatherings, petty jealousies will die out, and by unity a power will also develop which will help the profession from a political standpoint.

Round up, sound the bugle to assemble once again, then report the absentees, *defunct*.

PAN.

The essay on "Prevention of Tuberculosis," by Dr. John W. Parker, covering pages from 177 to 183, deserves the space allotted to it, for the subject is one of the greatest importance to the owners and the people of all nations, as well as our own.

The reference to the recommendations on Public Health, seven in number, should certainly bring about some action from the "fountain head," the government; and it may be well to remark that stress should be laid on the fact that no Board of Health can be perfect without having two or three veterinarians members of the Board.

The fact that the *seed* alone does not cause the disease, page 179, pp. 3, truly seems a strained *fact*. Not all the *seed* sown on the earth proper comes to the plant life, the soil not being suitable or the seed would not die. The disease cannot develop, however, without its *seed*, *i. e.*, the *bacillus*. The repelling power of the *vis inertiæ* inherent to the host rendering the seed abortive or inert.

The absence of hygienic laws in most dairy farms is patent; too much stress cannot be laid on this absurd neglect.

The slaughter of pronounced cases and leaving those not pronounced to grow into a perfectly pronounced case, before action is taken, is false economy with a vengeance.

The inspection of milch cows and licensing the dairy, as the custom is in London and its suburbs, is a good idea, if it can be done thoroughly.

The last paragraph deserves action, the suggestions are good, but should have ended with the formation of a compound State Board of Health.

PAN.

PROCEEDINGS OF SOCIETIES.

VIRGINIA STATE VETERINARY MEDICAL ASSOCIATION.

The first charter meeting of the Virginia State Veterinary Medical Association was held at the Young Men's Christian Association Hall, Richmond, Va., Thursday, March 22. This society was incorporated by the legislature at its last session, and only graduates of recognized veterinary and medical colleges are eligible to membership.

Among those present were Drs. Miller, of Cobham; Dixon, of Charlottesville; Niles, of Blacksburg; Faville, of Norfolk; Adamson, of Norfolk; Harbaugh, Donaldson and Swedberg, of Richmond.

The meeting was called to order by Chairman Harbaugh. After adopting a constitution and by-laws, as introduced by a committee consisting of Drs. Niles, Gilchrist and Faville, the election of officers followed. W. H. Harbaugh was elected president; N. P. Niles, first vice-president; J. H. Adamson, second vice-president; A. W. Swedberg, secretary; T. A. Donaldson, treasurer. A Board of Censors, consisting of ten members, including the regular officers, and Drs. Bushman, Bannister, Dixon, Gilchrist and Faville, was appointed.

The object of this society is to promote a fraternal fellowship among its members for mutual protection, and to advance the interests and practice of veterinary medicine and surgery. Several important committees were appointed, and a resolution was offered and adopted thanking the members of the legislature for granting the first veterinary legislation in this State. This was a rousing and enthusiastic meeting.

Motion was made to adjourn and convene at Norfolk, August 15.

A. W. SWEDBERG,
Secretary.

SEMI-ANNUAL MEETING OF THE ILLINOIS STATE VETERINARY MEDICAL ASSOCIATION.

LELAND HOTEL, SPRINGFIELD, Ill., February 21, 1894.

The meeting was called to order by the president, Dr. John Scott.

The roll being called, the following members responded to their names:

Drs. S. S. Baker, G. W. Browning, G. L. Crocker, C. D. Hartman, J. W. Ireland, J. T. Nattress, T. B. Newby, John Scott and M. Wilson.

The minutes of the last regular meeting were read and approved.

The amendment to Article IV of the By-Laws as proposed at last meeting by Dr. S. S. Baker, to the effect that no member shall be eligible to vote except his dues be paid in full to date, was adopted.

The motion was made by Dr. Wilson, seconded by Dr. S. S. Baker, that the rules be suspended for the time being and applications for membership received. Carried.

The names of Dr. A. Babb, "Ch. '93," Springfield, Ill., and Dr. W. T. Gwinn, "Ch. '93," Newman, Ill., were proposed by Dr. S. S. Baker.

They were elected to membership by acclamation.

J. A. McDonnell, M. D., of Chicago, was then called on for some remarks on experiments made with permanganate of potash as an antidote for morphine poisoning.

Meeting adjourned until 2 p. m.

Upon reconvening the president called on Dr. T. B. Newby for his paper on "Dentition Diseases."

After a lengthy discussion and the exhibiting of several specimens, the discussion of the paper was closed.

Dr. J. W. Ireland was then called on for his paper on "Acute Indigestion," and followed by Dr. Browning in his paper on "Castration on Cryptorchids."

Dr. J. T. Nattress then read his paper on "Fistulous Withers," and was followed by Dr. Babb on "Inflammation."

Bills to the amount of $35.25 were audited and ordered paid.

Motion was made by Dr. S. S. Baker, seconded by Dr. Wilson, that Dr. Bower Talbot be dropped from membership roll for not conforming to the rule and regulations of the association. Carried.

A vote of thanks was extended the essayists, and also the proprietors of the hotel for their accommodations.

The meeting adjourned until next regular meeting in November.

MATTHEW WILSON, M. R. C. V. S.

Mendota, Ill. *Secretary.*

MISSOURI STATE VETERINARY ASSOCIATION.

CLINTON, Mo., October 20, 1893.

The regular meeting of the Missouri State Veterinary Medical Association was called to order at 2.30 p. m. in the parlor of the Heckler House, by the president, Dr. L. M. Klutz, of Clinton, Mo. The secretary, Dr. W. Warren, being absent, Dr. J. H. Wattles, of Kansas City, was appointed secretary *pro tem.*

Dr. T. H. Arnold, of La Belle, Mo., was elected a member and introduced.

An essay on "Fistula" was read by Dr. Wattles, of Kansas City, and was discussed by all present.

Dr. Howard read a very interesting paper on "Colic." Discussion by all present.

Dr. DeWolf presented a very able paper on "Contagious and Infectious Diseases," and a general discussion followed.

There were several veterinary students present, among them James Cook and Thomas King, of Clinton, and B. J. Kaupp, of Nevada.

Adjourned until 7 p. m.

Meeting called to order, and nominations requested for officers for the coming year.

Dr. T. B. Howard, of Nevada, was elected president by acclamation.

Dr. Arnold, of LaBelle. was elected vice-president hy acclamation.

Dr. L. M. Klutz, of Clinton, was elected secretary by acclamation.

Dr. W. M. Bell, of Kansas City, was elected treasurer by acclamation.

Moved and seconded, that a committee of three be appointed to draft resolutions to be presented to the Secretary of Agriculture of the United States, requesting him to appoint none but graduates of regular veterinary colleges to positions as inspectors in the Bureau of Animal Industry. Committee—Drs. Bell, DeWolf and Klutz.

Moved by Dr. DeWolf, and seconded by Dr. Wattles, that we hold our next annual meeting in St. Louis, on Wednesday and Thursday, during the fair, meeting to be called to order at 10 a. m. on Wednesday.

The following resolutions were presented and passed unanimously:

WHEREAS, Dr. L. M. Klutz, our worthy president, has had the misfortune to lose his library, diploma, instruments and clothes by fire;

Resolved, That we, the Missouri Veterinary Medical Association tender him our sympathy and regrets at his financial loss.

Committee—Drs. Arnold and Wattles.

Moved by Dr. DeWolf, seconded by Dr. Arnold, that a letter of regrets be sent our State Veterinarian, Dr. Turner, at his inability to attend this meeting.

Moved by Dr. DeWolf, seconded by Dr. Howard, that a vote of thanks be tendered the citizens of Clinton, the press of the city, Dr. Klutz, Mr. Churchill, and to the Heckler House, for the kindness and courtesy that has been extended to us. Carried unanimously.

Motion was made by Dr. Arnold, seconded by Dr. Klutz, that a State law be framed regulating practice, and the following committee was appointed: Drs. DeWolf, Wattles, Bell.

T. B. HOWARD, *President.*
L. M. KLUTZ, *Secretary.*

ERIE COUNTY VETERINARIANS.

At a meeting held at the office of Dr. N. P. Hinkley, in Buffalo, Wednesday evening, March 28, 1894, for the purpose of organizing a veterinary medical society for the county of Erie, the following practitioners of veterinary medicine were present: Drs. J. Wende, Hinckley, Huessler, Ayers, Robinson, S. Somerville, Jr., B. Wende, Thompson, Block, Willyoung, McLeod, Gangloff, Willgansz and Wieland.

The meeting was called to order by Dr. L. E. Willyoung, who said:

"GENTLEMEN:—At the annual meeting of the New York State Veterinary Medical Society, held in Syracuse in January, 1894, the subject of organizing county veterinary societies for the different counties throughout the State was discussed at length. While New York and Brooklyn have each a county society, there are no others at present in the State. As officers of the State society we took it upon ourselves to organize and establish a permanent veterinary medical society for the county of Erie, with objects as follows:

"First. To hold regular meetings for the purpose of discussing professional subjects, for mutual improvement, and to improve the status of the veterinary

profession by bringing its members into more intimate relationship and consolidating them as a distinctive professional body in the community.

"Second. Members to consist of (*a*) charter members—all those practicing veterinary medicine who assist in the organization of the above association and conform to the regulations formulated by a two-thirds vote of those in attendance at the first meeting of the organization; (*b*) future members—to be elected, who shall be graduates of veterinary colleges which are legally entitled to grant veterinary diplomas and which shall be recognized by this association as properly qualified, equipped and conducted for the same.

"Applicants for future membership shall furnish: (1) Proof of graduation from one of such qualified institutions; (2) vouchers signed by two members of the association testifying to their reputable standing as business and professional men; (3) shall be elected as provided for by the by-laws of this association.

"Gentlemen! We have issued invitations to every veterinary surgeon registered at the Erie County clerk's office, and would be pleased to have every one become a member of this organization. The practitioners of human medicine have a county medical society, which has been in existence for several years, and they have been fortunate enough to secure legislation which in a measure enables them to control the practice of medicine in this county. It protects its members, encourages and benefits all newcomers and prevents impostors. In fact, in order to practice in this county a physician must first join the society. With the progress we are making—the attention and respect we meet with from our Legislature—how long will it be before our society shall be vested with the same power?

"Now, gentlemen, I would suggest that we appoint or elect a chairman for this meeting."

Dr. John Wende was called to the chair and Dr. Willyoung acted as secretary. It was decided by a two-thirds vote of those present that the name of the new association should be "The Erie County Veterinary Medical Society."

It was decided to hold the privilege of joining open to non-graduates till the next meeting. The election of officers was then taken up and resulted as follows: President, John Wende, V. S.; vice-president, L. Robinson, V. S.; secretary, C. J. Willgansz, V. M. D.; treasurer, E. J. McLeod, D. V. S.

On motion of Dr. Willyoung, the following committee on by-laws was appointed with instructions to report at the next meeting: Drs. Willyoung, S. Somerville, Jr., and Block, with the president and secretary.

The meeting adjourned to meet again April 11, at 8 p. m., at Dr. Hinckley's office.

C. J. Willgansz, V. M. D.,
Secretary.

CALIFORNIA STATE VETERINARY MEDICAL ASSOCIATION.

San Francisco, Cal., March 14, 1894.

On the above date the California State Veterinary Medical Association held its regular quarterly meeting at the Baldwin Hotel, San Francisco, Cal., at 7.30 p. m.

The meeting was called to order by the president, Dr. H. A. Spencer.

Owing to the absence of the secretary, Dr. D. F. Fox was appointed secretary *pro tem.*

Upon roll-call the following named gentlemen answered to their names: Drs. Maclay, Spencer, Sr., Spencer, Jr., Wadas, Orvis, Pierce, Robin, Williams, Forrest, Jackson, Hogarty, Eddy and Fox, visitor I. B. Dalzell.

On motion by Dr. Maclay the reading of the minutes of the previous meeting was dispensed with, and they were adopted.

The President then delivered the following inaugural address:

GENTLEMEN.—At the commencement of the year, by your selection I became your presiding officer, a compliment to myself, for which I am unable adequately to convey my gratitude. I shall endeavor, if careful study and strict attention to your deliberations profit anything, to work zealously for the interest of not only this Association but of the entire profession. How well I shall succeed will depend in a great measure upon the sympathy and assistance you may accord me. A hearty co-operation in the maintenance of order, in securing a large attendance, and a cheerful response to the appointment of essayists are the desiderata, without which even the brightest lights in the Association would fail. It would be the grossest egotism for me to aspire to that perfection as counsellor and parliamentarian that has been attained by my learned predecessors, those gentlemen chosen for their peculiar aptitude to direct the affairs of this organization through its infancy, when it was endangered by shoals and adverse currents on every hand.

If I succeed in winning your toleration during the ensuing year, and can transfer to my successor a larger roll of attending members, and a better financial condition than we now possess, I shall have realized my most sanguine expectations.

In addressing you upon this occasion I have deemed it best to offer my idea of what a Veterinarian, both socially and professionally, should be.

To my notion a Veterinarian should possess all the attributes of a gentleman, his education should be of a high order, he should be devoted to his profession, ever analyzing new theories, eagerly delving for knowledge that may be profitably applied to the ameliorations of the ills and injuries of such patients as he may be summoned to attend. It is his duty to strictly adhere to the ethics of his profession, always bearing in mind that through their medium only can the dignity of his vocation be sustained. He should cultivate a sympathetic feeling for those unfortunates that the merciful owner seeks his services to relieve. Nothing so thoroughly disgusts a client as unnecessary infliction of pain, or a rough coarse tone or manner. Honesty to patrons is a policy that none can afford to forego, for while we may secure a valuable fee by deception, we will most certainly incur a suspicion that will not stop with the aggrieved party.

Ours is a profession acquired by close application extending over a number of years varying in period according to the curriculum that the several schools or colleges may dictate, and he that would be successful must acquit himself of the intention to amass more than a simple competency; he should espouse the profession of a veterinarian not to get wealthy, but for the higher and nobler reason, the love of the cause. There is no employment among all the vocations of life more grand, more honorable or commendable than that of the individual who, from love of the creatures given to man for his use and companionship, has by arduous

study, keen sympathy and energy prepared himself for cure or amelioration of their infirmities, and to lessen the inclination that many of their diseases have to attack the health of the human race.

The science of Veterinary Medicine and Surgery comprises a knowledge of the anatomy and physiology of the domesticated animals, with an intelligent cognition of their pathological symptoms and treatment, and their communicability to mankind. Hence an intelligent understanding and application of bacteriology must prove of inestimable importance in checking the ravages of infectious and contagious diseases, and should be a part of the Veterinarian's stock in trade, to whose vigilance as a sanitarian the world must ultimately acknowledge a debt of gratitude.

A year has now passed since, through the almost superhuman exertions of this Association, an enactment for partial protection of Veterinary Medicine and Surgery was piloted through the sinuosities of the Senate and Assembly of the State of California. It is needless to recount the trials, tribulations and disappointments our members, and especially those of the legislative committee, were subjected to, in their efforts to inculcate into the "think tank," of the average California law maker, that we sought only to attain that distinction, recognition and protection that our usefulness and education proclaimed us entitled to, and that in giving us our rights they were subserving the interests of the Commonwealth. Suffice it to remind you that only after arduous and unceasing devotion to the sessions of three legislatures your committee, with your hearty co-operation, succeeded in getting a statutory enactment passed and signed by the governor, and that while it is restricted in its usefulness to certain conditions that in a measure impair its effectiveness, it is acknowledged to be the best law of its kind in the United States, and affords a very good foundation for subsequent amendments. It dictates a distinction between the veterinarian and the empiric that the public are by no means slow in appreciating. This is demonstrated by the fact that now the former's services are sought in nearly all instances where professional attendance is necessary; while on the other hand the Quack is continually reminded of the fact that legally and morally he is restrained from practice, and can only participate in the same by evasion. He is only tolerated, not patronized. These reminders place him in such an unenviable position that, unless he be devoid of pride, he will seek a more congenial and lucrative occupation. But while all this is gratifying, we must still be alive to the necessity of concerted action. Our work is but fairly begun. In addition to a more stringent and far-reaching law, we must have sanitary enactments, quarantine regulations, and above all, an officer to see that these shall be effective; nor will it do for us to confidently rely on our own ability to carry these measures to a successful issue; we must secure the assistance of every available influence. The press must be solicited to mould opinion and educate the public to the necessity of meting out justice to an honored profession. The medical profession, though dilatory, is finally realizing our importance as co-operators in the great work of protecting humanity from the inroads of pestilence and disease, and contributors to the longevity of mankind. By their sympathy and support much can be accomplished toward the final successful acquisition of our rights. A dignified and courteous demeanor, a studied regard for veterinary ethics, sandwiched with determined honesty, must certainly tend to give us social status and prestige that beget respect. While I

have no desire to arraign the members of our profession, still these attributes to gentility will go far toward elevating the Veterinary profession to an equal footing with its sister profession.

Let me earnestly appeal to you, to lend your support and sympathy to the United States Veterinary Medical Association, to whose efforts we must look for further elevation of our profession, and by whose assistance only can we look for higher education in our colleges, better recognition, more remunerative positions, and distinction from the government.

And finally, I beseech you to give your hearty support, individually and collectively, to the welfare of our own organization. Let each of us resolve to be in the van of progression, and laying aside our jealousies, prejudices and business differences, to make the California State Veterinary Medical Association foremost in the promulgation of knowledge and social intercourse.

DR. H. A. SPENCER.

Under the head of reading of papers, discussions, etc., Dr. H. F. Spencer read the following very interesting and instructive paper on "Purpura Hæmorrhagica:"

PURPURA HÆMORRHAGICA, ŒDEMA, ANASARCA, ETC.

MR. PRESIDENT AND GENTLEMEN:—I have been singularly fortunate in the treatment of this disease, not having lost a case of it in two years, save one that was taken out of my charge on the second day and given over to the tender mercies of a groom. I have treated a great many.

Purpura Hæmorrhagica is due to a paralysis of the vaso-motor nerves, which govern the circulation in the smaller blood vessels and capillaries, and also to an altered condition of the blood, the red blood corpuscles being smaller and shriveled in appearance as though treated with ammonia. The white blood corpuscles are increased in number, and there is an excess of the aqueous portion causing the coagulability of the blood to be greatly lessened.

Purpura usually follows some debilitating disease as influenza, but has been known to be due to unsanitary surroundings and poor provender. It usually follows a slight attack of catarrhal fever when the horse has made a rapid recovery, the exciting cause being usually exposure to cold, generally to cold draughts of air on a heated but not necessarily sweaty body—exposure to rain being more likely to cause pneumonia, pleurisy, etc.

Semiology.—The symptoms of this disease are quite variable, but on examination of the tongue you will notice a purple or claret color; later, petechiæ will appear on the schneiderian membrane, and often in the mouth along the lingual gutter, and on the frænum, then swellings appear around the nostrils, on the neck, belly and legs. These tumors are peculiar to this disease. They are about the size of a hen's egg, well defined, the edges being very abrupt. They pit slightly on pressure, are but slightly sensitive to the touch. They usually disappear and come again in twelve hours, but do not always appear in the same location as before. These tumors grow rapidly larger and coalesce until the legs are twice the normal size. The belly is swollen from two to four inches, and the line of swelling is very abrupt, as though a ligature had been fastened around. The animal becomes very stiff and sore from the swelling around the joints, the head sometimes swells to an enormous size, especially about the inferior maxillary, making the animal resemble

a hippopotamus more than a horse, and inconveniencing him greatly in feeding. The effusion around the glottis and nostrils sometimes renders breathing difficult. Thus far the temperature is but slightly elevated if at all, the pulse is normal or perhaps only a little weaker, the respiration is not altered if the œdema does not diminish the calibre of the nostrils or the glottis. The appetite is usually good, and the animal seems in good spirits, but does not move much on account of the swellings around the articulations. After three or four days there appears a serous-exudate on the skin over the œdematous parts that loosens the epidermis which dries up and cracks. If this exudate is very extensive there will be ulcerated spots on the skin. The petechiæ on the schneiderian membrane act as an irritant and produce a catarrhal discharge. There may or may not be swelling of the lymphatic glands from absorption of the exudate. The temperature may now be slightly elevated, the pulse and respirations accelerated. The appetite is usually good, or may be precarious. The rise in temperature, whan it occurs, is caused by the septic poisoning. At this stage there may be sloughing of the skin from the great pressure on it, or from poor circulation through it, or gangrene may occur from the same cause. Metastasis often occurs, the swelling which has been in the legs and belly suddenly leaves and appears in the head, causing great dyspnœa. Tracheotomy may seem necessary, but the animal will almost always die from septicæmia if tracheotomy is performed. The swelling may disappear and produce intestinal œdema, manifested by great abdominal pain, and usually ending in death, or it may terminate in an exhaustive diarrhœa which is hæmorrhagic in nature, or it may produce pulmonary œdema, in which case there would be marked dyspnœa without the swelling of the head. This indicates metastasis into the parenchyma of the lung. Septicæmia is very often the cause of death, especially if there be any sores or wounds on the animal. The symptoms in this case are the usual symptoms of septicæmia, rise in temperature, rigors, hurried breathing, fast weak pulse, etc.

The prognosis must always be guarded, as an apparently benign case at first may prove fatal in a very short time, while a very severe case may terminate by resolution in a few days.

Treatment.—Medicines must be used to alter the blood, viz.: to produce fibrin factors and more red blood corpuscles, and reduce the watery portions. My line of treatment is usually potassium chloride in half-ounce doses to produce fibrin factors and reduce the watery portions, iron to stimulate the production of red blood corpuscles, ergot to regulate or give tone to the blood vessels, and quinine as a tonic. I also use showers of cold water on the œdematous parts to produce a shock to the vasomotor system controlling the blood vessels.

H. F. Spencer, D. V. S.

The discussion was opened by Dr. Maclay. He highly recommended the use of cold applications to the swellings; he said there was no similarity between the subject under consideration and lymphangitis. The subject was further discussed by Drs. Orvis and Forrest.

Dr. Pierce was then called upon to entertain the meeting with a paper, which he did by reading an essay on "Parturient Apoplexy."

Mr. President and Gentlemen:—While nearly all of the papers that have been read at our meetings of late have been on some contagious or infectious

disease, I thought I would take up a more common subject; one we all meet very often in our practice, and one which gives us as much trouble as almost any other disease we meet.

The disease which I shall present to you for consideration is Parturient Apoplexy, or Milk Fever, the term usually applied to it by dairymen. It is a malady usually attended by fatal results, and is regarded with more dread by cattle owners than any other disease to which the cow is subject. Some breeds of cattle are more subject to it than others. The majority of cases coming under my notice have been among the high-bred Jerseys.

It is not my purpose to advance any new theory or treatment of this disease, but simply to bring out the views of the different members, through the discussion which I hope will follow.

Causes.—The causes are predisposing and exciting. Among the first, may be mentioned *high condition.* Well-fed cows, and especially large milkers, suffer from this disease, and one attack usually predisposes to another. The exciting cause is the act of parturition; and from my observation, I have noticed the disease follow a case of parturition where there has been very slight labor, the animal being in a plethoric condition. And, in my experience the owner says, almost always, that the cow had a very easy time calving, and cleaned in a very short time; and also, that the appetite was good previous to calving, and for twenty-four to forty-eight hours following; while on the contrary, I cannot personally call to mind one case of parturient apoplexy following a long and hard protracted case of parturition.

The pathology of parturient apoplexy appears to be largely a matter of conjecture, even with our leading writers on scientific subjects. Some animals, having a mild attack, recover with ordinary intelligent treatment, while others having it in a more severe form, succumb in spite of all our efforts.

It is a parturient disease, characterized by a sudden suppression of milk, congestion of the brain and apoplexy.

The excess of blood in the system, which before calving, went to supply the fœtus, instead of being diverted to the milk-producing channels, has been thrown back upon the system, and has a determination to the brain. This produces a state of coma, which has to run its course, and which terminates either favorably or unfavorably.

Symptoms.—The first symptoms usually occur in from one to three days after calving. There will be a very sudden diminished secretion of milk, loss of appetite and rumination ceases.

The respiration becomes hurried and plaintive. There will be knuckling in the fetlock, staggering gait, the animal sways from side to side and finally falls, very frequently never to rise again.

Treatment.—Many remedies have been prescribed. Some are good, others are worse than useless. Order the animal well bedded, and have sacks of straw packed around her, in order to keep her well upon the sternum. If called early, administer magnesia sulph. one pound.

Give enemas of warm water and soap, and if, upon examination, you find that the urine is not being passed freely, it should be drawn with the catheter at intervals not exceeding six hours apart.

If deglutition is not impaired, give stimulants at frequent intervals. If you do not get any action from the purgative, I recommend giving sulph. eserine, one grain, and repeat in one-half grain doses every hour until two and a half grains have been given.

Apply mustard to spinal column, and cold water or cracked ice to the head. As soon as the cow is able to rise, and her bowels have resumed their functions, give light sloppy food for a few days, and follow for several days with tonics.

Preventive measures.—Give a mild saline laxative, from three to five days previous to calving, and in many instances, all trouble may be avoided, thus verifying the old saying that, "An ounce of prevention is worth a pound of cure."

F. E. PIERCE, D. V. S.

The discussion was opened by Dr. Wadams, who recommended for treatment, croton oil and stimulants. Dr. Spencer, Jr., also recommended stimulants. Dr. Orvis suggested that different treatments should be tried by different veterinarians and reported to the Association. His idea of treatment is hyposulphite of soda and injections of stimulants, as alcohol, nux vomica, etc. Dr. Jackson has been very successful with the use of nux vomica and belladonna followed two days after by purgatives and enemas. Dr. Pierce said he had used sulphate of eserine with success. Dr. Forrest also favored the use of stimulants.

Dr. Maclay spoke on the pathology of the disease; he thought the vascular system should receive more notice than the nervous system. Dr. Spencer, Jr., was of the opinion that the disease was not an apoplexy. Dr. Maclay said he heartily agreed with Dr. Spencer.

There was considerable more discussion on this point which all tended to show that all of the members had reached the conclusion that the term apoplexy was nothing more than an "asylum ignorantiæ."

The president then closed the discussion with a few well-chosen remarks.

As Dr. Archibald was not present his paper was read by Dr. Fox, the subject being, "The Sympathetic Nerve System; or Why Orificial Surgery should cure or affect most Chronic Diseases, explained from an Anatomical and Physiological Basis." The paper was well received, and was discussed by most of the members present.

The president in closing the discussion mentioned a number of cases where he had seen good results from the application of orificial surgery in the human family.

Under the head of new business Dr. Maclay moved that a vote of thanks be extended to the essayists for the able and masterly manner in which they had entertained the meeting. The motion was seconded by Dr. Orvis and was carried.

On motion by Dr. Maclay the secretary was instructed to forward the results of the meeting to the veterinary journals.

On motion by Dr. Maclay a vote of thanks was extended to Drs. Archibald and Fox for the manner in which they had entertained the members at the last annual meeting in Sacramento.

The matter of the lost certificates was brought up and discussed, whereupon on motion by Dr. Maclay the president was requested to appoint a committee to look into the matter. The president appointed Drs. Orvis and Robin. Dr. Orvis

requested that Dr. Spencer, Jr, be substituted in his place, as it was impossible for him to attend to the matter. There being no objection it was so ordered.

Dr. Maclay then spoke at some length on the good of the Association, also on legislative matters.

Dr. Fox moved that the president appoint a committee of five on legislation, and that the committee be empowered to represent the Association at the meeting of the State Sanitary Convention in San Jose next month, also that the president appoint himself as one of the committee. The motion was seconded by Dr. Pierce and carried.

The president then appointed the following gentlemen on the legislative committee, viz.: Drs. Maclay, Spencer, Sr., Archibald, Orvis and Skaife.

The president appointed the following gentlemen as essayists for the next meeting, viz.. Drs. Fox, Eddy and Forrest.

There being no further business before the meeting it adjourned to meet in San Francisco, June 13, 1894.

R. A. Archibald, D. V. S.,
Secretary.

Sacramento, Cal.

PENNSYLVANIA STATE VETERINARY MEDICAL ASSOCIATION.

Philadelphia, March 6, 1894.

The Pennsylvania State Veterinary Medical Association assembled in the College of Physicians, Thirteenth and Locust streets, President Hoskins in the chair. The meeting was called to order at 10.30 a. m. At roll-call the following members were present: Drs. Allen, Benner, Bridge, Collins, Conard, Custer, Ferley, Formad, Gladfelter, Glass, Goentner, Harger, Hart, Walter L., Hart, John R., Hoskins, Houldsworth, Keely, Keil, Kooker, Lusson, McCarthy, McNeil, Pearson, Rayner, Thos. B., Rayner, Jas. B., Ridge, Sallade, Schaufler, Schreiber, Senseman, Webster, Williams, Zuill.

There were also present, Prof. Adams, of the Veterinary Department, University of Pennsylvania, Drs. McAnulty and E. S. Moyer, Dr. B. Lee, State Board of Health; Drs. Ritter and May as delegates from New Jersey State Veterinary Medical Association, Drs. Dustan and Lockwood. A number of students from the University of Pennsylvania were also in attendance.

Letters of regret were received from Drs. Lee and Waugh, Mr. Beitler, Director of Public Safety of Philadelphia, and Secretary Edge of the Board of Agriculture.

The minutes of the September meeting were then read by the secretary, and on motion adopted as read.

The president then read his address, which was as follows:

Mr. President, Fellow Members and Gentlemen:—To-day and to-morrow we complete the final strokes that forge for our organization another link in its years of growth, an ther cycle of development, that I am sure will leave a bright spot in the memories of us all, for the advancement of our science and adopted vocation. We, as your officers for the past two years, feel proud of the

record made during our stay as your servants; not for what we have done individually, personally or collectively as the administrators of your wishes, but rejoicing and happy in the recollections of the strong support, the steadfast devotion, the willing aid you have tendered us during our stewardship of your affairs, and we all with one accord tender to you our warmest appreciation, our sincerest thanks for your aid, help and united efforts in making for the Keystone State, the Keystone State organization of these United States. On other shoulders must now fall the mantle of responsibilities we have striven to discharge, and I am sure that you will take from your ranks others who will make still broader and better, still stronger and firmer, higher and grander, the structure which year by year has risen brighter and clearer, to shed its warm reflections and beckoning light upon every sister organization in our land and throughout the world. To those who are to grasp the helm and guide the good ship of our organization will perhaps come stormier seasons in the serious problems to solve; fiercer tempests to confront them, in the intricate meshwork of decisions to determine; rougher gales to weather in the unfolding of the newer conditions and environments of our calling, and upon you rests to-day a very serious duty in calling to leadership your strongest and best men, ones who will feel and realize in the enjoyments of these higher honors that they are but talents entrusted to their keeping; plants that they must nourish and foster to a richer growth and return to you in the future laden with fruits of good deeds, great achievements and higher attainments for our calling, and the brute creation over which we outstretch our strong arms in care and support, mingled with kindness, relief from suffering and better fitted to serve every need, use and service of man, their master.

Our next annual meeting will be the tenth in the Association's history, and it should be made a memorable one in the profession in our State. It would seem a wise movement to consider at this time the preliminary steps necessary to make suitable preparation for its being carried out on a scale worthy of the era it will date on the annals of veterinary science in Pennsylvania. A committee for this purpose of say ten of your members carefully selected by your new officers, covering geographically every section of our State, with a view of interesting every veterinarian in this movement, and of historically covering the rise and progress and curious history of the genealogy of the members of our calling, as well as a record of the various movements, etc., would be one means of arousing a general interest on this occasion as well as to afford us all much rich food for thought and suggestions for future avenues in which to direct our efforts.

The past six months in veterinary circles have witnessed many important events, and the present activity in Association work has never been equaled in the history of our country. The recent Veterinary Congress at Chicago was one of great good and interest to the profession at home and abroad, and its scope of work will be a factor of influence and good to the American veterinary profession for many years to come. In active consideration, aggressive work, foremost position, it was there demonstrated that our representatives were fully alive to every advance movement for the profession's good, and a unit in every proposition looking to a higher standard for our profession in education, cultivation and scientific commercial value to our nation and people.

The report of the Committee's work on Veterinary Education will steadily concentrate, direct and strengthen the hope that the time is not far distant when a

single degree will designate the American veterinarians at home and abroad, and that it will be the means of commanding for those who obtain it, a better recognition among foreign nations. The present variety of degrees, lack of a single standard of excellence, does a grave injustice to us as veterinarians, and it is hoped that every State Association will be active and earnest in the agitation of methods looking to a correction of this grave national educational defect.

On the subject of tuberculosis our position was well defined, and the most hopeful aspect of successful measures to cope with this dire calamity were adopted by the committee and received a hearty accord at the hands of the general congress, and if nothing more was accomplished than we have witnessed in the past six months in this direction alone, our congress would have been more than justified in its deliberations and purposes for the good it has been the progenitor of. At almost every veterinary gathering since October last, and these have been greater in number, stronger in attendance, more zealous and active in their efforts, the most active considerations have been given to the subject of tuberculosis, all looking toward better State and local sanitary laws, having for their object the eradication and control of this disease among the bovine family, and thus the wiping away of one of the greatest sources of its perpetuation and the dangers that lie therein in the food supply of our people, and for months to come associations are planning for action in this direction. To-morrow the subject will be considered by the Wisconsin State Veterinary Association of Graduates in convention assembled, and we would do well to send them fraternal greetings and encouragement in the good work. To-day our own organization will consider matters pertaining to this subject, all looking to better inspection laws and the control of all our animals as factors in the propagation of dangerous and insidious, contagious and infectious diseases.

The animal food supply and its relation to public health, its growing importance and the hope of more liberal and far-reaching regulations for its better control and security from dangers lurking therein, was excellently treated of by the committee to whose care it was assigned, and the gigantic character of the task and work in this direction was startling and amazing in its scope and magnitude.

Many minor subjects were there considered, all of great interest and importance to us as veterinarians.

Best of all, we found the profession so numerously represented geographically, and from so many heretofore divided avenues of our work, in thorough accord with the recent steps of the national organization in creating a higher standard of qualifications for its future membership. This was one of the most gratifying incidents of the congress, and it means no step backward for America, but the highest appreciation and support of the broadest education in veterinary channels the world may offer. Time will not permit now for a more extensive review of the work of our first congress, but to say in conclusion that the work achieved was more than gratifying to all those who zealously strove for its success. Pennsylvania and this Association were well represented on the floor of its deliberations, for which I take the opportunity of congratulating you, fellow members, and upon the shoulders of one of your number have been placed the grave and trying responsibilities of directing the affairs for the present year of the national organization.

Some few years ago, one who now graces our honorary membership urged from the chair of this Association the formation of local Veterinary Associations in single counties where the veterinarians were numerous enough and in contiguous counties in more sparsely populated centres. Removing from our city and State to a broader field of labor, we find him honored by the presidency of the organization in the Empire State, and marking out a more extended method of enlarging the good work of association circles. Through the appointing of county secretaries delegated with power, new local organizations are springing up over the State, all tending to strengthen the parent organization and governed by uniform rules and regulations, that must soon be potent factors in creating for our profession a better social position, a more generous support and recognition in law-making and law-executing halls, and the ultimate policing of our States with a corps of veterinary sanitarians. I am sure you with one accord join me in extending to our late member our warmest appreciation, unqualified support and unstinted commendations in the good work he is there doing; and our own efforts should be renewed and stimulated in continuing this line of work in our own State. Whether this can be best accomplished by continuing the power to so do in the hands of our general officers, or whether a committee of association organizers would best fulfill the purpose, I leave for your more mature deliberation.

To these organizations and all sister associations I commend the most earnest consideration and agitation of the necessary steps looking to the creation of a single veterinary degree for the entire profession of our land, and this once accomplished will wipe away one of the most potent influences militating against our better recognition than now exists, and the petty jealousies and wrangling of the comparative worth of a V. S., V. D., D. V. S., M. D. C., V. M. D., M. D. V., B. V. S., D. V. M., or what not, will be wiped out once and forever.

I cannot refrain at this time from comment on the serious period of depression we have passed through the past year, and while we to-day feel the force and influence of its results, we no doubt in the better promise of to-morrow will recall it only in the near future as among the fleeting memories of the past. By the result of the imposed self-denial, by the greater time for thoughtful study and searching after new truths in our uncertain science, we shall no doubt find in the future that these were precious hours for our better understanding and performance of our work.

Throughout our entire country during the present period of business disturbance there have been many temptations to win our members from the legitimate pathways of professional probity, and I am sorry to say that I have learned from others that some few of our members have been drawn over to the practice of charlatans and quacks and only exist to-day as parasites of the profession. I know of none in our own State, but questionable methods of advertising have been adopted by some and I regret to say by members of our own organization. Still, I have no words of censure, but only the strong pleading for a stronger moral force to sustain our members within the strict line of professional liberty. Newspaper puffs and cunningly worded advertisements, posing in the category of news items, are to be avoided by our members, as it is but a short step to the delusive advertisement of the quack, whose chief stock in trade is deception and imposition upon an oft-times too confiding public. Out of the furnace of molten metal comes the purest and best ore; out of the school of adversity comes the highest gem to adorn the

wearer and the cause he represents; and the memories of the sorest trials in such a period are often the sweetest recollections and the saving factors in all future reverses and changes that come to all people and nations with a cycle-like regularity. The ice that forms our bulwark and stay once strained, cracked or broken in its continuity never again seems to maintain that ideal beauty and strength, that has made the profession the admiration and highly respected avocation among those of intelligence and education in every community where the scientific follower of our calling resides. The open solicitation of clients, the standing in the market places of hire, commingling with the habitues of the horse marts, there to extend free advice and opinions, may at times win trade and clients, but it ever places the veterinarian in a compromising position, robs his decisions of much of their real weight and worth, no matter how sincerely and earnestly it may have been given, and lessens his professional dignity in the eyes of even those who cunningly profit by his free advice and information. Let us never be forgetful of the fact that we are not dealing with a common commodity that has a fixed and stable value in the marts of commerce, but are representatives of a profession, that requires not only a high degree of scientific knowledge, the quick perception of a well trained eye, the dexterity of an educated and well-controlled hand and the thorough study and keen watchfulness of each and every case that falls to our lot to minister to with every varying degree of age and disposition, breeding, character of work, environments and nature of labor or services performed, as well as a variety of attendance and kind of care and attention in health and disease it receives from owner, groom or stableman, all of which must ever be factors in guiding our proper treatment and consideration in the fields of labor that follows the pursuit of veterinary science. The true practitioner is once and forever a student, and years of experience only adds a more effective and thorough training to studentship and makes clearer and truer the deductions drawn from the limitless negative meshwork of signs and indications, by which we arrive at a correct diagnosis of the ailments to which we daily direct our efforts to restore and alleviate. Only those who so realize and deeply appreciate their calling will round out an honorable and profitable life-work, even though he may win the plaudits of his admirers, the gold of his followers, and perhaps the chief memory or mark left when gone will be measured by the size and height of the monument of stone that may be raised over his head by the wealth attained. Higher and better than all this, ineffaceable by the memories of time, but revered and honored in all ages, are those careers where every day were put forth the most earnest efforts to attain knowledge and the best way to use it, and such honored names as Bouley of France, Frosch of Denmark, Degive of Belgium, Percivall of England, and many others will never fade from memory so long as the veterinary profession exists in the whole world; while in a lesser degree only will there exist in State, county and town the honored name of some earnest, sincere and true devotee of our profession, to counsel well all our efforts, to stimulate our ambitions and to keep us in the narrow and straight path which always brings a rich return in the evening of life, with no bitter recollections of a mistaken conception of the high duties, grave responsibilities and noble character of work that lies in the domain of comparative medicine and surgery.

Truly it can be well said we are living in an age of progress, an era of intellectual advancement, and no one branch of the tree of science sways with a faster

movement or grander stride than the field of comparative medicine and surgery. Unfolding day by day new ideas, strengthening well-based theories, divulging new truths that win for us all a higher public approbation of our worth as a profession; rendering to our subjects greater immunity from suffering, and fitting our followers for higher duties in the field of sanitary medicine. From what we are promised in these two days of commingling, I am sure we will all return to our homes and fields of labor, better appreciating the newer era and higher progress of our calling in many new directions and more thoroughly equipped to do the work that comes as our daily toil.

All this with the daily added literature, the improvement in the columns of our veterinary publications, not to mention the valuable addition we have had added as an enterprise of our own State in the recent birth of the VETERINARY MAGAZINE, makes our cup of good things almost full to overflowing.

Your ever faithful, zealous, corresponding secretary will tell you to-day of the growth of our organization since our incumbency as your executive officers, and while it will not be all that we had hoped and wished for, it will have more than accomplished what we pledged ourselves to achieve in this direction when we met together to consider plans for our term of duty. Too much cannot be said of how favored you have been in the choice of this officer, and for the good of the Association I wish it were possible to continue so good a man—so earnest a worker, so ardent a lover of his profession—in this position for many years to come. In the lesser importance of their labors and responsibilities I hope we may be so fortunate as to be able to secure as future officers in the position of recording secretary and treasurer the same painstaking, willing and faithful officers as I have had associated with me during my two years as your presiding officer. I feel more than grateful for their unqualified support of all my efforts, and I feel that they one and all merit your warmest appreciation and just meed of praise for their faithful performance of the several duties allotted to their care and keeping.

In conclusion let us ever be mindful of the one great object of such organizations as this; that we are banded together to help one another; the strong to help the weak; the learned to enlighten those less so; the better to keep all our men and members strong in every just attribute of a complete veterinarian and to kindly counsel those who drift from the path of professional rectitude and conduct, and to daily examine ourselves that we may not be setting any dangerous precedent or example, to become an instrument of danger or punishment in the hands of our fellow worker. There is room for us all, and only the honorable means of fair competition will end well and bring to us all that just reward which comes as the result of honest endeavor and toil. The way of the unscrupulous and briber may gain a temporary victory, but the cost of such a battle won is filled with disappointment and pangs of regret and remorse, that carry us lower and lower in the depths of lost self-esteem.

I thank you, gentlemen, for your very kind attention.

W. HORACE HOSKINS,
President.

The chair announced that nominations for officers were in order, when the following nominations were made: President, Leonard Pearson; first vice-president, W. H. Ridge; second vice-president, Thos. B. Rayner; third vice-president,

Drs. Keil and Waugh; recording secretary, W. G. Benner; corresponding secretary, Drs. Helmer, Ridge, Harger, Allen, Gladfelter, Goentner; treasurer, Jno. R. Hart. Board of Censors, Drs. Harger, Zuill, Hoskins, Bridge, Kooker, Thos. B. Rayner, McNeil.

A motion was put that rules be suspended and the secretary cast the ballot for nominees where there was no opposing candidate. There being some objection, the chair ruled that a full ballot be cast. Drs. Jas. B. Raynor and Webster being appointed by the chair as tellers, the election resulted as follows:

President, Leonard Pearson; first vice-president, W. H. Ridge; second vice-president, Thos. B. Rayner; third vice-president, Jas. A. Waugh; recording secretary, W. G. Benner; corresponding secretary, F. S. Allen; treasurer, John R. Hart. Board of Censors, S. J. J. Harger, chairman; J. J. McNeil, W. Horace Hoskins, W. S. Kooker and W. L. Zuill.

Corresponding Secretary Ridge then announced the following applicants for membership: Dr. W. A. Shields, V. M. D., Dr. Chas. Ernest, V. M. D., Professor John W. Adams, V. M. D., Dr. E. S. Moyer and Dr. Jas. McAnulty, Drs. Tomlinson, Cawley and Fox.

A recess of fifteen minutes was then taken that the Board of Trustees might examine into the aforesaid applications.

The report of the trustees was given by Professor Harger, offering a favorable recommendation of Drs. Shields, Adams, Ernest, Moyer and McAnulty, and unfavorably recommending Drs. Tomlinson, Fox and Cawley.

The report of the Board of Trustees was favorably received.

A motion prevailed that applicants be elected singly by acclamation. The election of applicants was so conducted and Drs. W. A. Shields, Chas. M. Ernest, John W. Adams, Jas. McAnulty and E. S. Moyer were elected to membership. The president then introduced those of the elected members who were present.

At one o'clock a motion was entertained to adjourn for luncheon at "Boothby's Restaurant;" the same being extended by the Philadelphia members to all present.

The afternoon session was called to order at 2.15 p. m.

The chair announced that the delegates of New Jersey Veterinary Medical Association, Drs. Dustan and Lockwood, were present, and a cordial welcome with the privilege of the floor was extended to them. The chair further stated that 2 p. m. was the time appointed to open the discussion and consider the advisability of continuing the attempted legislation relative to milk and meat inspection, and that the letters of regret from Secretary Edge and Director Beitler were a disappointment to himself and all the members, as much information upon this subject was expected from them. He requested Professor Pearson to open the subject, which he did after stating in what form the bill had been presented to the Legislature. He laid considerable stress upon the importance of eradicating tuberculosis, and made valuable suggestions which were edifying to all present.

Dr. Benjamin Lee, of the State Board of Health, was the next speaker upon the subject, and gave many valuable suggestions. He thinks the standards of solids might be somewhat reduced, which would strengthen the Milk Inspection Bill, as

the reduction from twelve per cent to eleven per cent would make little difference to the health of the general public and would give the bill a better chance to pass. He referred to an act of the Massachusetts Legislature by which in May and June the standard of milk was lower, owing to the fact that animals grazed upon early vegetation while it contained much juice and in consequence could not yield such rich milk as when the grass was more mature. He spoke earnestly of the importance of eradicating tuberculosis in domesticated animals, the products of which were used for human food, and said that the State of Massachusetts had gone at it in earnest; that ten thousand dollars ($10,000.00) were appropriated in that State for laboratory work alone, and their entire appropriation amounted to forty thousand dollars ($40,000.00), while the appropriation in this State amounted to four thousand dollars ($4,000.00), but notwithstanding the township Boards of Health had multiplied rapidly, and in the near future there would be a local board in each township.

Professor Harger thinks the bill presented was too complicated; better a milk bill and a meat bill, but what is of first importance is stock inspection.

Dr. Schreiber thinks that any bill which would provide for the extermination of tuberculosis would be futile unless it was so framed as to necessitate the inspection of cattle from other States, thereby preventing the immigration of the disease.

Dr. Sallade thinks the general public should be better educated in tuberculosis and other contagious and infectious diseases, then there would be no trouble in getting laws passed to stamp out such diseases. The "Bovine Association" of which he is president, was formed for this purpose largely.

Professor Harger offered the following resolutions:

WHEREAS, the sanitary inspection of the various food stuffs consumed by man has reached such dimensions as to become a question for public discussion and knowing that their contamination with impurities is a menace to the public health,

WHEREAS, we have undisputed evidence that certain diseases affecting dairy animals are transmissible to man through emanations from these animals and their surroundings, and especially through the milk, as has been established in the case of tuberculosis of cattle and other diseases and which are the source of widespread and fatal diseases among mankind,

Be it resolved, that it is the sense of the Association that all dairies and their surroundings, the milk of which is offered for sale in this commonwealth, be thoroughly inspected and that its members display every effort in securing proper legislation to procure a pure and wholesome milk supply.

It was on motion adopted as the sense of the Association.

REPORT OF COMMITTEES.

Dr. Kooker, Chairman of Committee on Legislation, reported as follows:

TO THE PRESIDENT AND MEMBERS OF THE PENNSYLVANIA STATE VETERINARY MEDICAL ASSOCIATION:—We beg to state that since the semi annual meeting we have had no complaints of violation of the veterinary registry laws. The Keystone Association of this city appointed a committee to visit the Prothonotary's office and have the Veterinary Registry revised according to law, viz., have removals and

deaths so recorded on the registry. We would advise the appointment by the president of this Association of a member in each county to examine the registry and have it amended by noting the removals from the county and also those who may be deceased. We would like to have the sense of this meeting on the passage of a law requiring all those having diplomas and contemplating practicing veterinary medicine and surgery in this State to present the same before an examining board, which shall entitle them to be examined by said board, and if the examination prove satisfactory then said board will issue a certificate to that effect, which will entitle them to be registered. We would like this subject discussed before this meeting that the Legislative Committee may know the wishes of this Association in the matter of the bill as well as the passage of such a bill. In the event of this Association agreeing with this committee then the Legislative Committee will have a bill drawn up according to their wishes, and ready for presentation at the semi-annual meeting in September.

We would also bring before the Association the matter of the meat and milk supply and urge the profession to assist in every legitimate manner the Board of Health in its passage of such a bill. It is the opinion of this committee that the State Board of Agriculture that controls the contagious diseases of our live stock should be under the charge and control of veterinarians, and would like the sense of this Association on the subject.

W. S. KOOKER, *Chairman*,
T. B. RAYNER,
JAS. W. SALLADE,
FRANCIS BRIDGE.

The report of the committee was received and ordered upon the minutes, when on motion a committee of three was appointed by the chair to draw suitable resolutions in regard to establishing a State board of veterinary examiners. This committee consisted of Drs. Zuill, Pearson and Kooker, who subsequently offered the following resolution, which was adopted:

WHEREAS, It is the sense of this Association that the registration bill fails to accomplish the purpose for which it was intended; that, is, confining the practice of veterinary medicine to qualified practitioners; be it

Resolved, That the Legislative Committee of the Pennsylvania State Veterinary Medical Association of Pennsylvania be instructed to draft a bill, the object of which shall be better regulation and practice of veterinary medicine, to provide a board of veterinary examiners to examine all persons desiring to practice veterinary medicine in this State on the various subjects of their profession. The board to be appointed as thereinafter provided and to be known as the State veterinary examiner's bill.

W. L. ZUILL,
W. S. KOOKER.

It was further recommended that there be one member in each county represented in this Association, appointed to look after the county registry of veterinarians.

It was moved and seconded that the Committee on Legislation formulate a bill on the meat and milk supply, and report the same at the September meeting.

The following resolution was then offered by Dr. Williams, and on motion accepted:

WHEREAS, The veterinary profession has reached a stage in its development that may be properly designated independent, and is protected as an independent profession by the laws of the State of Pennsylvania; and

WHEREAS, We feel that it is within the power of the veterinarians of Pennsylvania to be of great public service to the owners and consumers of live stock and their products; be it

Resolved, That the matter of the control, eradication and investigation of contagious and other diseases among animals in this commonwealth should be directed and carried out by veterinarians, who indeed are the only ones capable of serving the best interests of the public in the above named capacity.

CHAS. F. WILLIAMS.

The next report was that of the Committee on Sanitary Science and Police by Dr. Formad.

REPORT OF CHAIRMAN OF COMMITTEE ON SANITARY SCIENCE AND POLICE.

MR. PRESIDENT AND GENTLEMEN:—As chairman of your Committee on Sanitary Science and Police, I beg leave to offer you the following brief report.

Fortunately for the community, we have not had any serious or extensive outbreaks of any contagious or infectious diseases beyond the existence to a greater or lesser extent of those forms of contagious diseases which are ever present with us.

In importance, bovine tuberculosis must necessarily be at the head of the list from the influence which it exerts in the transmission of the disease to man.

We had several local outbreaks of glanders, only one of which, at Wilkesbarre, proved very disastrous in its results.

A local outbreak of Texas fever near our city has become a matter of record, but the details and particulars I shall leave to my fellow-worker on the committee, Dr. Francis Bridge, from whose hands they must come to you in a necessary complete and official character, as he personally investigated that outbreak.

Tuberculosis is more prevalent near large cities than farther away from them, more prevalent in dairy cattle than in other classes of cattle. Recent tests with tuberculin have shown that more than one-half of the dairy cattle of some herds are tuberculous while in other herds the percentage of tuberculous cattle is very low and still other herds are entirely free from the disease.

Experienced veterinarians and breeders of cattle are of the opinion that tuberculosis in cattle is more prevalent now than it was a few years ago, which is seen in Europe as well, where it is corroborated by accurate statistics.

Many herds are so badly affected that the annual mortality destroys the entire profit from the remaining animals. In New York State whole herds have been examined by order of the State Board of Health and large numbers of animals have been slaughtered.

The agitation of the subject has so frightened the public that the consumption of milk has been greatly reduced in some places. It has also seriously affected

the value of some breeds of cattle. For the protection of the farmer's interest, aside from the question of public health, it is important that some definite legislative action should be immediately taken, placing the control of tuberculosis in cattle and the disposal of tuberculous animals on a fixed basis, so that there may be uniformity of action in this respect, and so that the owners of animals may know what to do, what to expect and how to govern themselves accordingly.

Since it is at present manifestly impossible to make a thorough examination of every bovine animal in the State, it would be well to start the examination with an inspection of the dairies supplying milk to the cities. The direction of the inspection of animals and the control of their diseases should be in the hands of competent veterinary authorities, who should also issue a bulletin of information to cattle breeders, informing them of the dangers to be feared from this disease and the hygienic and other measures to be adopted to restrict its progress and eradicate it from their herds. The veterinary inspector should have the power, under proper restrictions, to order the destruction of tubercular animals.

The question as to whether the owner should receive the whole value or part of the value or nothing is one which has received much attention.

To pay the full value for all tubercular animals would mean, as Dr. Lyman of the Massachusetts State Cattle Commission has pointed out, for the State to go into business of buying up tuberculous animals from all parts of this great country, for they would immediately be shipped to Pennsylvania almost as rapidly as fat cattle are now shipped to Chicago. On the other hand, if nothing were paid for these tuberculous animals the owners would suffer an excessive, sometimes a ruinous loss in the interest of the public welfare. We might say that a tuberculous animal is worthless and therefore has no value, but we all know that they are sometimes very productive in the dairy and frequently make beef of reasonably good appearance. The proper course and the just one would seem to be to arrange for the division of the loss between the owner and the Commonwealth. A reasonable maximum value for the cattle for the various classes should be decided upon. The condemned cattle appraised within this limit by competent and unprejudiced appraisers. After their destruction the owner should receive a portion, say one-third or one-half of the appraised value.

Before closing my remarks on the subject of tuberculosis, I desire to revert to the value of tuberculin, as a diagnostic agent, and that we are no longer justified in depending only upon methods of physical diagnosis in determining the existence of this disease in herds where we have found cases existing. Surely it would seem that we have just entered upon the real field of learning in regard to one of the probable means of the spread and propagation of tuberculosis. In a well-timed article recently read by Professor Jas. Law before the New York Association and published in the last month's magazines, this question has been carefully and thoroughly discussed. We have been rudely awakened to a probable source of danger in this insidious disease. It seems that we have not been sufficiently impressed with the importance and influence of this disease. It may be the final explanation why the disease is so widespread and so powerful in its results.

We probably have been looking too long for the direct transmission of the tubercle bacilli from parent to the offspring and straining our eyes looking in the microscope for the existence of bacilli in the udder or in the milk and have wholly

lost sight of the general distribution of the poisonous products which are also present in the animal economy. In other words, we have been trying to discover in the body, in the secretions of the mammary gland, floating tubercle bacilli, or in the gland some localized tubercular masses and apparently utterly ignorant of the fact that these same channels, which might bring the original bacilli to this point were sending, distributing and revolving and attempting to eliminate through every excretory channel the poisonous products that followed the introduction of these germs into the system.

In this connection also I would impress upon the members of the Association the value of mallein as an agent in the diagnosis of glanders, especially because there is no one disease which comes to us so clouded in obscurity as glanders, and which by physical signs more than severely tests the ability of an expert to decide. The use of mallein seems as far as known a perfectly safe test, but a much surer one than the common practice of testing by the inoculation of some other animal with the discharge of a questionable ulcer or perhaps of a single farcy-like bud.

DR. ROBERT FORMAD.

Dr. Bridge, also a member of said committee, was asked to address the members upon the subject, which he did. He said that in the last year thirty-nine herds of cattle were reported in the State which had suffered from tuberculosis, numbering altogether 450 head, ninety-one of which were diseased. Fifty-eight head were destroyed, which fully exemplified the disease, and in five head no visible traces of the disease appeared. The entire number had been tested with tuberculin, and of the ninety-one which showed some reaction all were destroyed. That 150 cases of glanders were reported; of this number sixty-one were found diseased, but that altogether sixty-eight head had been destroyed. These were also tested with mallein. He further reported the outbreak in two herds of "anthrax," of which six animals died.

The committee's report was accepted, and a vote of thanks extended the committee for the same.

There was no report from the Committee on Intelligence and Education, owing to the fact that a letter from the chairman, Dr. Weber, stated that on account of illness he was unable to be present and was unable to draft a report. This matter had been referred by him to Dr. Helmer, who also was unable to be present at the meeting.

The report of Corresponding Secretary Ridge was then read, and, on motion, received and ordered spread upon the minutes.

REPORT OF CORRESPONDING SECRETARY.

In the year 1887 this Association had twenty-nine members, and in that year took in two members, but later one of these was expelled. In 1868 the Association took in three new members, one of these afterward being expelled. In 1889 we took in fourteen new members, of which three have been expelled. In 1890 seventeen new members were admitted, of which one has been expelled. In 1890 we added six new members, of which one has been expelled. In 1892, like 1890, we added seventeen new members, while in 1893 we added to our membership twenty-eight names, making our roll stand to-day 109 members in good standing. In 1892 we had sixty-four new members, but the rapid increase of forty-five new

members in these last two years shows that our Association is in a healthy condition, but have we anything to boast of? this being a State Association. We only have twenty-eight counties represented, while there are thirty-eight counties in this State that do not give us a member.

In Adams County we have no member, while in Allegheny County we have five members. Armstrong, Beaver and Bedford give us none. In Berks we have three, Blair and Bradford none, while Bucks County gives us six; Butler, Cambria, Cameron, Carbon, and Centre are not represented. Chester thinks the Association a good institution and gives us seven good members. Then we come to Clarion, Clearfield, Columbia and Cumberland, with no members, but Clinton gives us one and Crawford two. Dauphin gives us one and Delaware four. Erie one, Elk none, Fayette one, Forest and Fulton none. Franklin gives us four, while Greene and Huntingdon have no members. Indiana and Jefferson give us one each. There is no member from Juniata, while Lackawanna and Lancaster have two members each; Lawrence none. Lebanon has two members, and Lehigh gives us five. Luzerne gives us three, Lycoming one, while we have McKean, Mercer, Mifflin and Monroe not represented. Montgomery gives us nine, Montour none, Northampton two, Northumberland one, Perry none, while old Philadelphia heads the list with thirty-seven. Pike and Potter have none, Schuylkill has two, Snyder, Somerset and Sullivan none, Susquehanna one, Tioga, Union, Venango and Warren none, Washington and Wyoming one each. Wayne and Westmoreland have none, while the last county, York, gives one.

The reprints of our last annual meeting were not received until after our semi-annual meeting, but were sent out as well as the semi-annual reprints. As our proceedings are published in our veterinary journals, we think this matter of sending out reprints useless expenditure.

Next in order, the treasurer's report was read.

PHILADELPHIA, March 6, 1894.

TO THE PRESIDENT AND MEMBERS OF THE PENNSYLVANIA STATE VETERINARY MEDICAL ASSOCIATION:—I respectfully submit the following annual report as to the condition of the treasury for the year ending March 6, 1894.

The assets during the last year, 1893–1894, have been $555, the expenditures $512.57, leaving in the treasury a balance of $42.53.

JOHN R. HART,
Treasurer.

Approved by Auditing Committee—W. G. Benner, W. H. Knight, L. Lusson.

Meeting adjourned to meet the following day, March 7, 10 a. m. sharp.

PHILADELPHIA, March 7, 1894.

The second day's session of the Pennsylvania State Veterinary Medical Association was called to order by President Hoskins at 10.30 a. m. The following members were present: Drs. Allen, Benner, Collins, Ferley, Foelker J. C., Formad, Gladfelter, Harger, Hart John R., Hart Walter L., Hoskins, Houldsworth, Keely, Keil, Knight, Kooker, Lusson, Miller W. B. E., McCarthy, Pearson, Phillips, Rayner Thos. B., Ridge, Sallade, Schaufler, Sturge, Tagg, Timberman, Webster, Williams, Zuill, Marsack, Adams, Felton, Nicholson, McAnulty, Rhoads.

As delegates from New Jersey Veterinary Medical Association, Drs. Dustan and Lockwood. As visitors from New Jersey, Drs. Runge and Bailey; from Delaware, Dr. Eves; from Maryland, Dr. Martenet. Also S. G. Hendren, E. L. Kellner, A. Sallinger, R. M. Black, U. G. Houck, F. A. M. Bertram, Thos. Castor, E. H. Moore, G. W. Dilkes, S. K. Green, F. T. Shannon, F. H. Andrews, E. Mount, E. E. Terry, E. Knight, C. J. Marshall, J. M. Carter, R. J. S. Weicksel, C. E. Fouse, J. J. Rechtenwald, E. Hogg, B. M. Underhill, C. W. Boyd, M. L. Brackbill, Geo. E. Harder, R. D. Heaton and G. F. Hartler.

A letter was read from Dr. J. A. Waugh, in which he regrets his absence, and in which he calls attention of the Association to an advertisement published in the *Spirit of the Times* (sporting paper) date, December 3, 1893, of the Ontario Veterinary College advertising for students for a term of three months. This letter was referred to the Board of Trustees.

The chair says, whereas the Wisconsin State Veterinary Medical Association of Graduates were this day in session also considering kindred subjects to ours, that this Association should extend their congratulations, whereupon a motion to that effect prevailed, and Drs. Ridge, Kooker and Timberman were appointed to compile a message of congratulations and forward the same to Wisconsin Association, which was answered by the Wisconsin Association in very warm terms.

Delegates appointed to various State Associations were then asked to report.

Dr. J. C. Foelker reported as delegate to the International Congress held at Chicago. Dr. Kooker, delegate to the New Jersey Veterinary Medical Association, reports that he was unable to attend. A similar report came from Dr. Timberman, who was a delegate to the New York State Veterinary Medical Association. Dr. Lusson reported that he could not get the time and place of meeting to which he was appointed.

An application for membership of Dr. C. S. McKenna was read by the secretary and the same was referred to the Board of Trustees.

An auditing committee was appointed by the chair to audit bills, vouchers, etc., Drs. Benner, Lusson and Knight.

At this time a short recess was taken, that the Board of Trustees and Auditing Committee might complete their work.

The Board of Trustees being prepared to report, Dr. C. S. McKenna was favorably recommended, whereupon he was elected to membership.

The board also presented the following in reference to Dr. Waugh's letter:—

To the Pennsylvania State Veterinary Medical Association.

We beg leave to report that we have presented to us for consideration a letter from Dr. Jas. A. Waugh, calling our attention to an advertisement in the *Spirit of the Times*, a sporting paper, dated December 3, 1893, by the Ontario Veterinary College, advertising for students for a term of three months, and that we deprecate the action of the Ontario Veterinary College and recommend that this Association censure the Faculty of the said college for abbreviating the course of veterinary education.

The recommendations of the board were received.

The Auditing Committee report the treasurer's report and bills correct.

Dr. Zuill's paper being called for was read, entitled "Surgical Treatment of Lesions of the Hock;" after which the chair stated that if there were no objections

he would ask for the reading of the paper by Dr. E. Sturge, on "Penetrant Cauterization in Treatment of Lameness for Ostitis," as both papers covered much of the same ground and the discussion would then take place on both papers. There being no objections Dr. Sturge read his paper. The discussion following proved very interesting, critical and conflicting, and was participated in by Drs. John W. Adams, W. B. E. Miller, Harger, Pearson, Eves of Delaware, Martenet of Maryland, Sallade, Hoskins, Foelker and Allen.

At 1.15 p. m. adjourned for lunch.

The meeting reconvened at 2.30 p. m. The Board of Censors favorably recommended for membership Dr. C. S. McKenna, and on motion his election followed.

The chair then called attention to the fact that the Comitia Minora of the United States Veterinary Medical Association would shortly meet to determine upon a place of meeting for 1894. He had been importuned by many that this State and Philadelphia should be favored with this meeting, and it was now open for further consideration by the members. Many of the members strongly urged that the Association take active steps to have the meeting for Philadelphia, and it was afterward moved and seconded and carried that the chair appoint a committee of three to draw up a suitable appeal and to use their influence in winning the meeting for Philadelphia. The chair stated he would leave these appointments to his successor in office.

Dr. Miller then followed with his paper on castration, which, after reviewing the various methods, treated at length all the features connected with the performance of the operation with the animal standing. He also explained the method adopted by Farmer Miles in operating upon cryptorchids and answered many criticisms made of his results in so operating. The paper was discussed by Drs. Pearson, Harger, Zuill, Breisacher and a motion offered by Dr. Pearson that a vote of thanks should be tendered Dr. Rogers for stimulating Dr. Miller to prepare the paper just read carried.

Dr. S. J. J. Harger then gave a very interesting paper on "Atmospheric Air in the Veins," recording a list of carefully performed experiments with the results obtained.

This paper was discussed by Drs. Adams, Zuill and Breisacher.

The subject of "Transfusion of Blood," by Dr. W. G. Benner, was postponed until the September meeting.

Under reports of cases, Dr. James T. McAnulty reported an interesting case of fracture of the os pedis.

The place for holding the semi-annual meeting was then considered, Harrisburg and Pittsburg being named. A vote being taken, Harrisburg was chosen.

The retiring president then introduced the president elect, Dr. Leonard Pearson. The latter on taking the chair very warmly thanked the members for the high honor they had thus conferred.

The other officers elect were severally introduced and each accepted the new duties allotted him.

ROBERT GLADFELTER,
Recording Secretary.

Since the above meeting the following committees of the Pennsylvania State Veterinary Medical Association have been appointed by President Pearson :

COMMITTEES OF THE PENNSYLVANIA STATE VETERINARY MEDICAL ASSOCIATION.

Committee on Legislation—W. H. Hoskins, chairman ; S. J. J. Harger, W. S. Kooker, J. C. McNeil, W. H. Ridge, J. W. Sallade, Charles Schaufler.

Committee on Sanitary Science and Police—M. E. Conard, chairman; Francis Bridge, C. R. Good, Joseph D. Houldsworth, C. C. McLean, B. F. Senseman, R. G. Webster.

Committee on Intelligence and Education—J. W. Adams, chairman; W. B. E. Miller, E. Sturge, William Tagg, S. E. Weber.

VETERINARY COMMENCEMENTS.

THE CHICAGO VETERINARY COLLEGE

held its eleventh annual commencement exercises on Tuesday afternoon, March 22, at half-past two o'clock, in the Grand Opera House. The graduates were:

J. S. Anderson, W. F. Andrews, M. T. Bernard, J. Biggs, G. A. Bond, C. J. Britton, B.A., C. C. Brown, B. F. Browne, W F. Brownlee, J. J. Bruemleve, O. F. Butterfield, H. J. Campbell, P. A. Carlson, C. A. Clinton, A. Collasowitz, F. J. Croxon, P. L. Darcey, G. L. Dixon, A. E Duckworth, S. H. Ellery, K. Farrar, G. R. Flowers, D. P. Frame, E. S. Fry, J. H. Gain, F. T. Gaskin, T. J. Heter, T. H. Hicks, J. P. H. Hornig, I. W. Horton, F. Hunt, E. N. Hutchinson, B.S., H. Jones, J. F. Jones, H. J. Kannal, R. Kerr, D. E. Kinsella, R. Kuoni, W. F. Lazear, G. W. Loveland, W. Matz, A. J. Mauland, W. E. McBain, Jr., B. C. McClintock, E. A. McCullough, C. E. McIntire, J. H. McLa n, Ph.G., D. H. Miller, W. A. Myers, A. S. Nesbitt, W. H. Netherland, B.A., C. O. Netherton, J. W. Otto, J. N. Piatt, C. J. Rhodes, A. L. Robinson, O. Rydell, S K. Shenck, G. L. Simon, J. D. Sprague, C. E. Stewart, H. J. Stewart, H. L. Stewart, J. W. Styles, R. W. Thomas, Wm. Thompson, F. P. Tobin, R. H. Treacy, C. F. Van Blankensteyn, B. F. Ward, C. A. White, J. W. White, P. J. Wilkinson, A. S. Withers.

GRADUATING EXERCISES.

The nineteenth annual commencement of the American Veterinary College was held at Chickering Hall, New York City, on Tuesday evening, March 20, 1894, when the following young gentlemen received diplomas:

Albert Francis Abbott, Dover, N. H.; George Cornelius Bretherton, New York, N. Y.; John Russell Bacon, Danbury, Ct.; Hugh Edward Clark, Cornwall-on-Hudson, N. Y.; Chauncey Leonard Chase, Berlin, Ohio; James Shaw Cattanach, Jr., New York, N. Y.; Augustus Henry Drucker, New York, N. Y.; Michael Joseph Doyle, New York, N Y.; Harry Stillwell Field, Hempstead, N. Y.; Oscar Fausner, New York, N. Y.; William Rowan Fleming, Brooklyn, N. Y.; John Oliver George, A.B., A.M., Weaversville, Pa.; Hamilton Gutmann, Easton, Pa; John Joseph Hayes, New York, N. Y.; Jacob P. Helmer, Scranton, Pa.; Richard Wilkins Hewitt, Bridgeton, N. J.; Harry G. Hoover, Sterling, Ill.; John Kent, New York, N. Y.; Newton C. Lazarus, Allentown, Pa.; George Leich, Brooklyn, N. Y.; James Lorimer Lindsay, New York, N. Y.; Patrick John McGuiness, Newark, N. J.; Francis Joseph McCaffrey, Brooklyn, N. Y.; Charles McCulloch,

Jr., Howardsville, Va.; James Masterton, Biggar, Lanarkshire, Scotland; Charles Philip Martin, New York, N. Y.; William Brundage Moorhouse, Tarrytown, N. Y.; Robert Flanders Moore, Pocatello, Idaho; Ira Chasey Mattatall, West Tatamagouche, N. S.; Bryce Mars, New York, N. Y.; Harry Stanislaus O'Neill, Jamaica, N. Y.; Oscar T. Porzer, Brooklyn, N. Y.; Joseph Forman Roser, Maysville, Ky.; John Joseph Riordan, Beverly Farms, Mass.; Frederick Luman Ray, Leonia, N. J.; Albert E. Schnable, Indianapolis, Ind.; William Christian Siegmund, Baltimore, Md.; Harry Clifton Terry, Torresdale, Pa.; Henry Otto Wolters, New York, N. Y.; Andrew Ward, Peacedale, R. I.; Christian Henry Westphal, San Francisco, Cal.; William Watkins Yard, Jr., New York, N. Y.

THIRTY-SEVENTH ANNUAL COMMENCEMENT

of the New York College of Veterinary Surgeons and School of Comparative Medicine was held at Chickering Hall, Wednesday evening, March 21, 1894. The following prizes were awarded:

John A. Kiernan, Jersey City, gold medal for best general examination.

Silver medal for best general Junior examination, W. E. A. Wiemann, Brooklyn, N. Y. Special mention, E. A. Manuel.

Comstock Prize, pocket case of instruments for best anatomical specimen, John C. Petersen, Copenhagen, Denmark.

Jenkins Prize, veterinary books, for the best written and defended thesis, Reuben C. Gross, Eastmont, Pa.

The Buntin Prize, case of surgical instruments for best Senior examination in Materia Medica, John A. Kiernan, Jersey City, N. J.

The White Memorial Prize, case of instruments for the best practical examination, conducted by a committee composed of Dr. Thos. Giffen, chairman; Dr. Rush S. Huidekoper, Dr. Herbert Nehr, awarded to Bruce MacKay, New York City.

After the evening's exercises a banquet was tendered the graduates at "The Columbia," with covers for seventy-five.

Graduates.

Sylvester H. Dean, Grand Forks, N. Dak.; David B. Dennish, Trenton, N. J.; William M. Fleischman, Westchester, N. Y.; William Gall, Aberdeen, Scotland; Reuben C. Gross, Eastmont, Pa; Elias A. Gruver, Hellertown, Pa.; Patrick J. Hogan, Minesville, N. Y.; Peter T. Keeley, Waterbury, Conn.; John A. J. Kiernan, Jersey City, N. J.; Wesley Massinger, Chalfont, Pa.; Elijah Mathews, Jersey City, N. J.; Frank A. McCullough, New York City; Bruce McKay, New York City; William H. Newton, Dunham Basin, N. Y.; Russell Osborne, Wilkesbarre, Pa.; John C. Petersen, Copenhagen, Denmark; Harry C. Shoemaker, Philadelphia, Pa.; Alfred J. Tuxill, Auburn, N. Y.; Edward E. Vaughn, Brown's Mills, N. J.

ONTARIO VETERINARY COLLEGE.

TORONTO, CANADA.

The annual closing exercises of the Ontario Veterinary College were held in the lecture room of the college Saturday, a. m., March 24, 1894. Professor Andrew Smith, principal, presided, and was supported on the platform by prominent professional gentlemen from all parts of the dominion.

Prizes and diplomas were distributed as follows :

Pathology—Seniors, A. W. Whitehouse, first prize, silver medal; C. A. Sankey, second prize; W. R. Fullerton and Z. L. Rogers (equal), third prize.

Chemistry—Seniors, N. Morgan, first prize; John F. Fitzsimmons, second prize; T. D. Jones, third prize.

Materia Medica—Seniors, first prize, A. W. Whitehouse; second prize, C. A. Sankey and G. R. Fetherolf (equal).

Anatomy—Seniors. A. W. Whitehouse, silver medal; C. A. Sankey and R. Turnbull, second prize; Judson Black and A. W. Hinman, third prize.

Morbid Anatomy—Seniors, first prize, Arthur W. Whitehouse; second prize, Charles A. Sankey; third prize, Robert Turnbull.

Entozoa—Seniors, Judson Black, S. D. Myers and A. W. Whitehouse (equal), first prize.

Physiology—Seniors, A. W. Whitehouse, first prize, silver medal; Charles A. Sankey, second prize; S. H. Ward, third prize.

Dissected Specimens—Seniors, A. B. Campbell, gold medal, given by the Toronto Industrial Exhibition Association; A. B. Campbell, second prize, $30; S. A. Bradley, third prize, $20.

Best general examination—Charles A. Sankey, gold medal.

Special prize to the student taking the greatest number of first prizes—A. W. Whitehouse.

Pathology—Juniors, William Fotheringham, first prize; R. L. Graham, second prize; J. A. Tancock, F. Vans Agnew and E. M. Hendy, third prize, (equal).

Chemistry—Juniors, David Hood, first prize; J. W. Stalker, second prize; William Fotheringham, third prize.

Anatomy—Juniors, Frank Vans Agnew, silver medal; Alfred Henthoeffer, Webber McKibben, second prize; R. L. Graham, E. T. Handy, third prize.

Physiology—Juniors, F. Vans Agnew, first prize, silver medal; W. Fotheringham, second prize; W. McKibbon, third prize.

Examination in Microscopy—Juniors, S. P. Bishop, first prize; William Fotheringham, second prize; Fred. Wilson, third prize.

GRADUATES.

Andrew L. Alton, Oakville; Walter N. Armstrong; Arthur W. Baker, Cortland, N. Y.; Henry C. Babcock, College Springs, Iowa; Claude Bailey, Rosemont; Alfred Barradell, Kettleby; Levi Porter Beechy, Berlin, Ohio; Christian F. Behner, Grand View, Ill.; William R. Bell, St. Louis, Mich.; Lincoln L. Bishop, Delavan, N. Y.; Judson Black, Yale, Mich.; John C. Blackwell,

Centralia, Wash.; Harry P. Bock, New Ringgold, Pa.; Delbert A. Bonesteel, Frankford; E. Grant Britton, Guy's Mills, Pa.; Thomas Burns, Croghan, N. Y.; Joseph Butters, Motherwell; Andrew J. Battin, Shunk, Pa.; Samuel A. Bradley, Louisville, Ky.; Archibald B. Campbell, Toronto; Richard Colthurst, Cork. Ireland; Clare V. Connell, Wauseon, Ohio; James Crail, Tipton, Ind.; John T. Cunningham, Woonsocket, R. I.; Charles F. Curtiss, Parker, S. D.; John F. Cline, Glenboro', Man.; John T. Dade, Hutchinson, Kansas; Clem. M. Detar, Fryburg, Pa.; Richard G. Dingman, Portland, Oregon; Wilber C. Doss, Pittsfield, Ill.; James M. Douglas, Dundee, Scotland; Joseph M. Douglass, Hendrum, Minn.; Jaroslav J. Drasky, Wilber, Neb.; J. W. Dunham, Owatonna, Minn.: I. S. Deitrich, Hamburg, Pa.; Charles F. Ebner, Ipswich, S. D.; Thomas Falconer, Grandin, N. D.; Robert O. Fenton, Kingsley, Iowa; B. Fisher, Creston, Iowa; George Fitchett, Pinnebog, Mich.; John F. Fitzsimmons, Danbury, Conn.; Andrew G. Fortune, Vesta; Fred. L. Foust, Defiance, Ohio; Frank Fowler, Plum Creek, Man.; William R. Fullarton, Dubuque, Iowa; George R. Fetherolf, Mahanoy City, Pa.; George S. Gates, Oneida, Ill.; Otto H. Gebhardt, Alpena, Mich.; E. D. Gleason, Carlinville, Ill.; Joseph M. Good, Greenwood, Miss.; William F. C. Gregg, Barrie; William J. Glasgow, Springfield, Mass.; Francis A. Harsh, Augusta, Ohio; E. W. Heighway, London; Albert W. Hinman, Braddock, Pa.; Thomas S. Hitch, Griggsville, Ill.; John Howie, Barnett; William F. Heyde, St. Louis, Mo.; W. R. Hunter, Lewiston, N. Y.; Christian D. Hemmy, Juncan, Wis.; Peter I. Johnson, Marion, N. Y.; George B. Jones, Nevins, Ill.; T. D. Jones, Avoca, Pa.; James S. Joyce, Mansewood.; Amandus H. Kistler, Andres, Pa.; Albert J. Kline, Ridgeville Corners, Ohio; W. L. P. Knoll, Montrose, Pa.; William E. Kreider, Wadsworth, Ohio; John E. Laidlaw, Glenworth; L. Sherman Lane, Harrisburgh, Ohio; Walter E. Lathrop, Bad Axe, Mich.; D. J. McColl, Lucan; Alexander McConnell, Jarvis; W. W. McCrae, Steubenville, Ohio; John T. McElroy, Concord; John McGillicuddy, Watford; John G. McGuffin, London; P. L. McCollum, Lewiston, N. Y.; R. J. Marshall, Brandon, Man.; Charles H. Martin, Buffalo, North Dakota; Harry M. Martin, Townshend, Vt.; W. E. Martin, Perry, Mo.; Robert E. Monteith, Killarney, Man.; Norman Morgan, Strathroy; Henry H. Muecke, Sioux City, Iowa; Robert Mollance, Kirkcudbright, Scotland; Augustus C. Murphy, Sydney, C. B.; Sylvester J. Murray, Medo, Minn.; S. Forest, Musselman, Cynthiana, Ky.; Elisha Myer, Ottawa, Ill.; Horace A. Myers, Lodi, Ohio; Sydney D. Myers, Wooster, Ohio; W. M. Molyneaux, Forksville, Penn.; John Neville, Decatur, Mich.; James Nicholson, Edinburgh, Scotland; Erasmus M. Nighbert, Palmyra, Ill.; William C. Orr, Dillon, Montana; John Henry Penfold, Tweedside; James W. Price, Reynoldsburg, Ohio; William Pullyblank, Keene; Sydney J. Rasberry, Hamilton; William H. Richardson, Watford; Robert Robb, Newman, Ill.; James E. Robertson, West Union, Iowa; Harvey W. Robinson, Guilford, Ind.; Z. L. Rogers, East Palestine, Ohio; Richard C. Rolles, Maryborough; M. B. Rombough, Morden, Man.; James D. Ross, Port Dover; Henry J. Rowe, Sandusky, Ohio; William J. Rooks, Holland, Mich.; J. Gill Sallade, New Ringgold, Pa.; Charles A. Sankey, Bossevaine, Man.; Walter A. Seale, Granby, P. Q.; W. J. Shields, Lake Talon; Ernest H. Shuttleworth, Beaconsfield, Iowa; John A. Smith, Ivan; Wade H. Smith, Pleasant Corners, Ohio; William H. Smith, Morden, Man.; J. Rowe Snively, Lanark, Ill.; O. F. Stearns, Windham,

Vt.; James C. Stevens, DeRuyter, N. Y.; E. W. Sunderlin, Auburn, N. Y.; Francis Taggart, Wilsonville; F. Evans, Tibbals, Somerset, Ky.; Robert Turnbull, Danville, Ill.; H. A. Turner, Syracuse, N. Y.; Adam R. Van Luven, Cape Vincent, N. Y.; George M. Walrod, Lake View, Iowa; Frederick A. Walsh, Kingston; S. Hay Ward, Clandeboye, Man.; Le Roy Webber, Rochester, N. Y.; H. F. Whaley, San Francisco, Cal.; Arthur W. Whitehouse, Laramie, Wyoming; E. J. Whitworth, Lynedoch; Robert J. Willis, Brampton; Charles L. Widmeyer, Gretna, Man.; C. Otto Wagoner, Akron, Ohio; W. H. Wilkinson, Almont, Mich.; John W. Welch, Toronto.

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THE
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AN OBSCURE AND UNDESCRIBED DISEASE OF THE DEER FAMILY.

BY JAMES A. WAUGH, V. S.
Allegheny, Pa.[1]

A herd of thirty-three deer, of all ages and both sexes, were confined last summer in a natural wooded and watered enclosure in a large and deep ravine, including sufficient range and pasturage, at the zoological gardens in Schenley Park, Pittsburg, Pa. These deer belonged to the ordinary American varieties common to the States East of the Rocky Mountain country, and several had been received from Mexico and Michigan, and had been in confinement only eight or nine months, while others had been in confinement several years.

A number of these deer sickened during the latter part of summer, and Ardary Bros., the city veterinarians, were called in to treat them. However, they were unable to discover or account for the cause of the sickness, but recommended a change in the food, and prairie hay, and bran and mixed grain were fed for a while, yet a number of the deer succumbed to the disease. It was now deemed advisable to change the remainder of the herd to other grounds and they were brought into the winter quarters, which were the only convenient and available enclosures on the premises, and adjoined a wire screen fenced corral where eight very fine elk were confined in an old orchard. The finest buck in the herd sickened and died, and the second best buck, a very fine animal, sickened; also a fine large doe and a yearling fawn. The doe was dry, having lost her fawn

[1] Read at meeting of Pennsylvania State Veterinary Association, March 6, 1894.

by death shortly after its birth. Ardary Bros. recommended Superintendent McKnight to call the writer in consultation, as it now appeared the entire herd was in a dangerous condition, and it was feared the herd of elk might contract the mysterious disease.

We found the sick doe presenting the following symptoms: great muscular emaciation and marked debility; muco-purulent discharge from nostrils; rapid breathing; temperature 103 F. The pulse was not counted owing to the excitement due to capture. Urine was passed frequently and in small quantities. Fæces were bloody and passed frequently, and looked very much like the colored glucose compounds commonly sold as currant jelly. The ears drooped and the expression of countenance was anxious and indicated acute suffering. The patient remained in a recumbent position almost constantly, ate and drank sparingly, and occasionally walked about the corral. The fawn presented similar symptoms but in a much milder type, which was probably due to an earlier or less advanced condition of the disease. The disease generally proved fatal in the fawns at an earlier stage and in a less advanced form than in the adult deer. The sick buck occupied a recumbent position nearly all the time, got up frequently and micturated small quantities of normal looking urine, and defecated a soft and slimy substance mixed with bloody mucus; and he ate and drank very sparingly, appeared dull and dejected, and, although a great pet, was loath to answer the call of his keeper or approach the feed trough at the usual time.

It was evident that these deer were affected with an obscure and undescribed disease, which was puzzling to all concerned, and should be studied carefully for the benefit of comparative medicine and veterinary science. We considered this matter very carefully and decided to feed a better quality of upland prairie hay and give some hyposulphite of soda in a good quality of chopped feed every day to the entire herd. We gave the sick deer medicinal doses of fld. ext. opii and sulphate of quinine at regular intervals every day; also recommended a free allowance of city water obtained from the Allegheny River. Spring water had previously been used. We thought that the disease would probably prove fatal to the sick doe, and requested the authorities to notify us in case any of the deer died. The disease proved fatal to the sick doe and fawn about three

days after the writer first saw them. The usual duration of sickness of the fatal cases was from three to ten days. Dr. R. W. Ardary and the writer were duly notified and we repaired to the park and held a careful post-mortem examination on these two cadavers shortly after death. Four-year-old doe presented the following interesting condition: Stomach and duodenum inflamed in many parts and ulcerated and perforated in spots from the size of a United States nickel to that of a silver quarter-dollar; and these ulcerations and perforations were covered and blocked with a peculiar white fibro-mucous substance somewhat resembling cooked corn-starch. The stomach contained considerable semi-digested food, and, strange to relate, none of the contents of the stomach had escaped into the abdominal cavity. The bowels were partly filled with the substance heretofore described. The mucous membranes of the nostrils were considerably inflamed, but the lungs and other organs were in an almost normal but anæmic condition.

The fawn's stomach and duodenum were not perforated in any place, and appeared normal internally, but were covered externally with a confluent vesicular and pustular eruption scattered throughout the walls of the stomach and duodenum. The greater curvature of the stomach seemed to be the part most severely affected in the fawn. Contents of stomach and bowels same as heretofore mentioned and described in doe.

We were much surprised at finding these strange pathological conditions, and saved and cleaned and placed the diseased stomachs and duodenums in alcohol, and expressed them to the National Veterinary College at Washington, D. C., and they were promptly turned over to the pathologist of the the Bureau of Animal Industry, United States Department of Agriculture, who kindly reported to us that they were unable to find any pathological lesions that might account for the morbid conditions. I believe these specimens are yet preserved in the Museum of the National Veterinary College, where they will prove interesting and instructive to students of veterinary science.

The sick buck convalesced nicely and recovered from the disease, and though he remained thin for a time, is now enjoying excellent health. He was a remarkably well domesticated deer, and a great favorite with the attendants, who experienced no difficulty in administering the medicines. The

disease proved fatal in all others visibly affected except this fine buck. Numerous hypotheses were advanced to account for this strange sickness and fatality among the deer, but nothing tangible was discovered. None of the other deer sickened or suffered in any way, and the eight elk remained free from disease. The elk were fed mixed clover and timothy hay alternated with choice prairie hay and chopped grain, and occasionally a little bran or middlings, with salt at regular intervals, and free access to city water. Cut grass was supplied occasionally as an adjunct to the grazing.

The writer has not been able to find any literature on diseases of the deer, although the public libraries of both cities were carefully searched. However, this subject is well worthy of further study. We corresponded with Dr. J. C. Meyer, Sr., V. S., of Cincinnati, Ohio, who has had an extensive experience with wild animals in captivity in the Cincinnati zoological gardens, and he kindly gave us much good advice and suggested a line of treatment, but could not enlighten us upon the name or nature of this mysterious disease. No doubt undomesticated deer in their natural state suffer from certain forms of diseases that have not yet been studied by modern civilized man.

The writer saw a young antelope fawn, which was captured in Southern New Mexico, while suffering with a disease the symptoms of which somewhat resembled the common form of distemper in the dog. The ranchers informed me that they had found and captured this young antelope while sick and suffering near the remains of its dam, which had sickened and died on the prairie. The young antelope recovered without any treatment except medicinal doses of bicarbonate of soda administered with the milk, and frequent bathing of its eyes with cold water. Domestic medication was the only available treatment, owing to the remoteness of drug stores.

A PRELIMINARY CATALOGUE OF THE PARASITES CONTAINED IN THE COLLECTIONS OF THE UNITED STATES BUREAU OF ANIMAL INDUSTRY, UNITED STATES ARMY MEDICAL MUSEUM, BIOLOGICAL DEPARTMENT OF THE UNIVERSITY OF PENNSYLVANIA (COLL. LEIDY) AND IN COLL. STILES AND COLL. HASSALL.

By C. W. Stiles and Albert Hassall,
Bureau of Animal Industry, United States Department of Agriculture, Washington, D. C.

[*Begun in the April number.*]

III. CESTODES.

SPECIES.	HOST.	LOCALITY.	COLLECTOR.	COLLECTION.
TETRARHYNCHUS				
tenuicaudatus				Leidy.
sp.	Lutjanus campeachianus			"
LIGULA				
simplicissima		Germany	C. W. S.	C. W. S.
TETRABOTHRIUM				
macrocephalum	Colymbus septentrionalis	Leipsic	"	"
barbatum	Odontaspis			Leidy (type).
sp.	Mesoplodon Sowerbiensis			B. A. I.

SPECIES.	HOST.	LOCALITY.	COLLECTOR.	COLLECTION.
DIBOTHRIORHYNCHUS				
reptans	Pogonias chromis			A. M. M.
BOTHRIOCEPHALUS				
cestus	SALVELINUS sp.			Leidy.
latus	Homo			B. A. I.
proboscideus	Salmo salar	Berlin	C. W. S.	C. W. S.
punctatus			"	"
sp.	Salmo salar	England	A. H.	A. H.
DIBOTHRIUM				
cordiceps	SALMO MYKISS	Montana	Linton	B. A. I.
sp.	Gulo luscus			Leidy.
SCHISTOCEPHALUS				
dimorphus	ALCA TORDA	Leipsic	C. W. S.	C. W. S.
SOLENOPHORUS				
megacephalus	Python sp.		Coll. Leuckart	C. W. S.
obovatus	Boa constrictor	England	A. H.	A. H.
sp.	Python sp.	D. C.	"	B. A. I.
TÆNIA s. st. (type species, *T. solium*)				
(*a*) Cysticercus				
crassicollis	Felis domestica	D. C.	Common	B. A. I.
	"Tænia from a cucumber," Leidy			Leidy.
(*C. fasciolaris*)	FIBER ZIBETHICUS	Maryland	A. H.	B. A. I.
	Mus decumanus	D. C.	Common	"
	M. musculus	"	"	"
marginata	Canis familiaris	"	"	"

(*C. tenuicollis*)	Bos taurus	Leipsic	C. W. S.	C. W. S.
	Capra hircus	D. C.	Curtice	B. A. I.
	CARIACUS VIRGINIANUS	D. C.	A. H.	"
	KOBUS ELLIPSIPRYMUS			A. M. M.
	Ovis aries	D. C.	Common	B. A. I.
	SEMNOPITHECUS sp.		Chapman	Leidy.
saginata	Homo	D. C.		B. A. I.
	Homo	Leipsic	C. W. S.	C. W. S.
(*Cysticercus bovis*)	ANTILOCAPRA AMERICANA	D. C.	A. H.	B. A. I.
	AUCHENIA LANIA	"	Lucas	"
	Bos taurus	Chicago	Melvin	"
serrata	Canis familiaris	Paris	C. W. S.	C. W. S.
	Canis familiaris	D. C.	Common	B. A. I.
	UROCYN CINERO ARGENTATUS	Virginia	A. H.	"
(*C. pisiformis*)	Lepus cuniculus	Paris	C. W. S.	C. W. S.
	L. sylvaticus	Virginia-Maryland	Common	B. A. I.
solium				
(*C. cellulosæ*)	Homo	Maryland	Osler	(J. H. U.)
	Sus scrofa	Leipsic	C. W. S.	C. W. S.
	"	Montana		B. A. I.
	"	Chicago	Melvin	"
(*b*) Cœnurus				
cœnurus	Canis familiaris	England	A. H.	A. H.
serialis	Canis familiaris	Pennsylvania	Weber	B. A. I.
(*C. serialis*)	LEPUS CALIFORNICUS	California	Curtice	"
	L. CAMPESTRIS	Minnesota	Wood	Leidy.
	L. cuniculus	England	A. H.	A. H.
	"	Texas	Curtice	B. A. I.
(*c*) Echinococcus				
echinococcus	Canis familiaris	D. C.	Curtice	B. A. I.
	" "	Leipsic	Coll. Leuckart	C. W. S.

SPECIES.	HOST.	LOCALITY.	COLLECTOR.	COLLECTION.
(*E. polymorphus*)	Bos taurus	England	A. H.	A. H.
	Homo	Brooklyn	Van Cott	C. W. S.
	"	. . . . .	. . . . .	Leidy.
	Ovis aries	Leipsic	C. W. S.	C. W. S.
	Sus scrofa dom.	D. C.	Moore	B. A. I.
(*E. multilocularis*)	Bos taurus	Leipsic	C. W. S.	C. W. S.
TÆNIA				
A. MAMMALIA.				
bipapillosa	PHASCOLOMYS WOMBAT	. . . . .	. . . . .	Leidy.
laticollis	LYNX CANADENSIS	. . . . .	. . . . .	A. M. M.
litterata	Canis familiaris (Esquimaux)	. . . . .	Kane	Leidy.
marmotæ	ARCTOMYS MARMOTA	. . . . .	Coll. Blanchard	C. W. S.
pectinata	Lepus timidus	Leipsic	C. W. S.	"
sp.	DASYPUS 9-CINCTUS	D. C.	A. H.	B. A. I.
sp.	Erythrizon dorsatus	"	Curtice	"
sp.	Lepus palustris	. . . . .	. . . . .	Leidy.
sp.	L. sylvaticus	Maryland	A. H.	B. A. I.
sp.	"	. . . . .	Curtice	"
sp.	"	. . . . .	Uber	C. W. S.
sp.	MEPHITIS MEPHITICA	Colorado	Curtice	B. A. I.
sp.	MESOPLODON SOWERBIENSIS	. . . . .	"	"
sp.	Scalops aquaticus	Maryland	A. H.	A. H.
sp.	SPERMOPHILUS TOWNSENDI	"	"	"
sp.	TAMIAS STRIATUS	. . . . .	"	B. A. I.
sp.	TAXIDEA AMERICANA	Colorado	Curtice	"
B. AVES.				
angulata	Turdus viscivorus	England	A. H.	A. H.
candelabraria	Ulula aluco	Leipsic	C. W. S.	C. W. S.

fringillarum	Passer domesticus	England	A. H.	A. H.
	Turdus viscivorus	"	"	"
infundibuliformis	Gallus domesticus			Leidy.
lanceolata	Anser domesticus	England	A. H.	A. H.
microps	Centrocercus urophasianus	Ft. Bridger	Carter	Leidy.
odiosa	Ortyx virginianus	Florida	Warren	"
pestifera	Dolichonyx orizivorus			"
	Icteria virens		Warren	"
scolopendra	Podiceps cornutus			A. M. M.
sulciceps	Diomedea exulans	England	A. H.	A. H.
unilateralis	Butorides virescens	Florida	Warren	Leidy.
vexata	Hylotomus pileatus			"
	Elanoides forficatus	Florida	Warren	"
sp.	Accentor modularis	England	A. H.	A. H.
sp.	Actitis macularia		"	B. A. I.
		Maryland	"	A. H.
sp.	Aix sponsa	"	"	"
sp.	Amodramus passerinus	"	"	"
sp.	Antrostomus carolinensis	Florida	Warren	Leidy.
sp.	A. vociferus	D. C.	A. H.	B. A. I.
sp.	Ardea cærulea	Florida	Warren	Leidy.
sp.	Arditta exilis	Maryland	A. H.	A. H.
sp.	Aytha americana	"	"	"
sp.	Botanoris mugitans	Florida	Warren	Leidy.
sp.	Buteo borealis	Maryland	A. H.	A. H.
sp.	Cardinalis cardinalis	"	"	"
sp.	Cathartes aura	"	"	"
sp.	Chelidon erythrogaster	Maryland	A. H.	A. H.
sp.	Colaptes auratus	"	"	"
sp.	Columba domestica	Havanna, Cuba	Balmaseda	B. A. I.
sp.	Colymbus auritus	D. C.	A. H.	"
sp.	C. septentrionalis	Leipsic	C. W. S.	C. W. S.

SPECIES.	HOST.	LOCALITY.	COLLECTOR.	COLLECTION.
sp.	CORVUS AMERICANUS	D. C.	A. H.	B. A. I.
sp.	C. OSSIFRAGUS	Maryland	"	A. H.
sp.	DENDROICA ÆSTIVA			B. A. I.
sp.	D. VIGORSI	Maryland	A. H.	A. H.
sp.	Dolichonyx oryzivorus	"	"	"
sp.	DRYOBATES PUBESCENS	"	"	"
sp.	EREUNETES PUSILLUS	"	"	"
sp.	GALEOSCOPTES CAROL	"	"	"
sp.	GALLINULA GALEATA		"	B. A. I.
sp.	Gallus domesticus		Curtice	B. A. I.
		Florida	Bitting	"
sp.	GEOTHLYPIS FORMOSA	Maryland	A. H.	A. H.
sp.	HARPORHYNCHUS RUFUS			Leidy.
sp.	ICTERIA VIRENS	Maryland	A. H.	A. H.
sp.	JUNCO HIEMALIS	"	"	"
sp.	Larus argentatus	"	"	"
sp.	MELANERPES ERYTHROCEPHALUS			Leidy.
		Maryland	A. H.	A. H.
sp.	RALLUS VIRGINIANUS	"	"	"
sp.	MELOSPIZA FASCIATA	"	"	"
sp.	MOLOTHURUS ATER			Leidy.
sp.	ŒDEMIA DEGLANDI	Maryland	A. H.	A. H.
sp.	PROGNE SUBIS	"	"	"
sp.	QUERQUEDULA DISCUS	Florida	Warren	Leidy.
sp.	QUISCALUS QUISCULA	Maryland	A. H.	A. H.
sp.	Rhea americana			Leidy.
sp.	SETOPHAGA RUTICILLA	Maryland	A. H.	A. H.
sp.	SIALIA SIALIS	"	"	"
sp.	SITTA CANADENSIS		Curtice	B. A. I.

sp.	Somateria Dresseri	D. C.	A. H.	B. A. I.
sp.	Syrnium nebulosum	Maryland	"	A. H.
sp.	Tringa maculata			B. A. I.
sp.	Turdus migratorius	Westchester	Warren	Leidy.
sp.	Tyrrannus tyrrannus			B. A. I.
sp.	Urinator lumme	Maryland	A. H.	A. H.
C. REPTILIA.				
racemosa	Boa constrictor	D. C.	A. H.	B. A. I.
sp.	(encysted)	"	"	"
sp.	Eutainia sirtalis	Maryland	"	A. H.
sp.	Trionyx sp.			A. M. M.
D. AMPHIBIA.				
dispar	Bufo lentiginosus	D. C.	Common	B. A. I.
	Rana halecina			A. M. M.
sp.	Acris gryllis	Maryland	A. H.	A. H.
sp.	Hyla Pickeringii	"	"	"
sp.	Rana clamitans	D. C.	"	B. A. I.
E. PISCES.				
ambloplitis	Ambloplites rupestris	New York		Leidy.
filicollis	Amia calva			"
simplicissima	Gadus callarias			"
sp.	Anguilla vulgaris	Maryland	A. H.	A. H.
sp.	Esox reticulatus	"	"	"
sp.	E. sp.			Leidy.
sp.	Gadus sp.			"
sp.	Lophius piscatorius	Trieste	C. W. S.	C. W. S.
sp.	Micropterus salmoides			B. A. I.
sp.	Salmo namaycush		Curtice	"
ANOPLOCEPHALIA				
mamillana	Equus caballus	London	A. H.	B. A. I.
perfoliata	" "	"	"	"
plicata	" "	Philadelphia	Zuill	Leidy.

SPECIES.	HOST.	LOCALITY.	COLLECTOR.	COLLECTION.
MONIEZIA (type *M. expansa*)				
alba	Ovis aries	Italy	Perroncito	B. A. I. (type).
Benedeni	O. aries	Lille, France	Moniez	C. W. S. "
denticulata	Bos taurus		Coll. Rudolphi	" "
expansa	Antilope dorcas		" "	" "
	O. aries		" "	" "
	B. taurus	D. C.	A. H.	B. A. I.
Neumanni	O. ARIES	Lille	Moniez	C. W. S. (type).
nullicollis	O. ARIES	"	"	" "
oblongiceps	COASSUS sp.	D. C.	A. H.	B. A. I. "
planissima	B. TAURUS	"	Common	" "
	O. ARIES	"	"	"
trigonophora	O. ARIES	Blairsville	C. W. S.	" (type).
THYSANOSOMA				
actinioides	Ovis aries	D. C.	A. H.	B. A. I.
	" "	Colorado	Curtice	"
Giardi	" "	Paris	C. W. S.	"
DIPYLIDIUM				
caninum	Canis familiaris	Paris	C. W. S.	C. W. S.
	" "	D. C.	Common	B. A. I.
	Felis domestica	"	Doran	"
STILESIA				
centripunctata	Ovis aries		Coll. Neumann	B. A. I.
globipunctata	" "	India	Giles	"
	" "		Coll. Neumann	"

HYMENOLEPIS				
diminuta	Mus decumanus	D. C.	Common	B. A. I.
diminuta?	M. decumanus	England	A. H.	Leidy.
flavopunctata	Homo			Leidy.
murina	M. musculus	D. C.	A. H.	B. A. I.
nana	Homo	Italy	Coll. Sonsino	C. W. S.
pusilla	M. decumanus	England	A. H.	A. H.
Tænia loliginis	Loligo sp.	Maine	Chapman	Leidy.
Cysticercus	African monkey			"

IV. NEMATODES.

SPECIES.	HOST.	LOCALITY.	COLLECTOR.	COLLECTION.
ASCARIS				
A. MAMMALIA.				
canis (*mystax*)	Canis familiaris	D. C.	Common	B. A. I.
	Felis domestica	"	"	"
	LYNX CANADENSIS			Leidy.
columnaris	MEMPHITIS sp.			"
leptoptera	Felis leo			"
	F. TIGRIS			"
lumbricoides	Dicotyles Sp.?	D. C.	A. H.	B. A. I.
	Homo	Maryland	"	"
	OVIS ARIES	D. C.	"	"
		Blairsville, Pa.	C. W. S.	"
	Sus scrofa	D. C.	Common	"
megalocephala	Equus caballus	Maryland	A. H.	"

SPECIES.	HOST.	LOCALITY.	COLLECTOR.	COLLECTION.
osculata	MACRORHINUS ANGUSTIROSTRIS			Leidy.
simplex	Phocœna sp.	England	A. H.	A. H.
tentaculata	Didelphys virginiana			Leidy.
transfuga	URSUS HORRIBILIS	D. C.	Baker	B. A. I.
sp.	FELIS PARDALIS	"	A. H.	"
sp.	LYNX RUFUS	"	"	"
sp.	MEPHITIS MEPHITICA	Colorado	Curtice	"
B. AVES.				
compar	Ortyx virginianus			Leidy.
depressa	POULES VIRGINIANUS			"
	STRIX BRACHYOTUS			"
diacis	QUISCALUS QUISCULA			"
eniscaudata	Mimus proglottus			"
longa Leidy	Tantalus loculator			"
microcephala	ARDEA HERODIAS			"
	BOTAURUS MUGITANS			"
	Herodias egretta	Florida	Warren	"
	Hydranassa tricholor			"
	NYCTIARDEA GRISEA			"
serpentulus	Ardea violacea			"
spiculigera	Pelecanus fuscus	Kansas	Mayo	B. A. I.
	P. tetrarhynchus			Leidy.
	PHALACOCORAX DILOPHUS			"
	Plotus anhinga			"
spiralis	Bubo virginianus	Maryland	A. H.	A. H.
subulata	ANTROSTOMUS VOCIFERUS			Leidy.
turula	Buteo lineatus			"
sp.	BUTORIDES VIRESCENS			"
sp.	Owl, gen. sp.		Marx	B. A. I.

C. REPTILIA.				
anoura	HETERODON NIGER			Leidy.
	Ophibolus Sp.?			"
	Python morulus			"
holoptera	Tortoise gen. sp.	England	A. H.	Hassall.
nuda	Crotalus adamanteus			Leidy.
	CROTALUS HORRIDUS			A. M. M.
penita	Trachemys scabra			Leidy.
porcipara	Tortoise gen. sp.	England	A. H.	Hassall.
sulcata	Trachemys scabra			Leidy.
tenuicollis	Alligator mississippiensis			"
sp.	Python			"
sp.	Tropidonotus sipedon			"
D. AMPHIBIA				
entomelas	Rana halecina			Leidy.
E. PISCES.				
adunca	Alosa sapidissima			"
clavata	GADUS CALARIS			"
	GADUS TOMCOD			"
clupearum	Clupea sprattus	England	A. H.	A. H.
neglecta	Diodon			Leidy.
salaris	Gadus morrhua	England	A. H.	A. H.
sp.	CARCHARIAS CERULEUS	Bahamas	Dolley	Leidy.
HEDRURIS				
androphora	Amblystoma mexicana			Leidy.
	Nanemys guttata			"
OXYURIS				
ambigua	Lepus cuniculus	D. C.	Moore	B. A. I.
		Leipsic	C. W. S.	C. W. S.
compar	Felis domestica			Leidy.

SPECIES.	HOST.	LOCALITY.	COLLECTOR.	COLLECTION.
curvula	Equus caballus	Maryland	A. H.	B. A. I.
obvelata	Mus decumanus	D. C.	Curtice	"
vermicularis	Homo	"	"	"
sp.	ARVICOLA PINETORUM	Maryland	A. H.	A. H.
sp.	A. RIPARIUS	"	"	"
longicollis	Tortoise gen. sp.	England	"	"
sp.	Cistudo carolina	Maryland	"	"
Paronai	MACROSCINCUS COCTEI	Italy	Parona	C. W. S.
HETERAKIS				
A. MAMMALIA.				
sp.	Mus decumanus	Massachusetts	Winchester	B. A. I.
sp.		D. C.	Curtice	"
B. AVES.				
inflexa	Gallus domesticus	Florida	Bitting	"
	PHASIANIUS GALLUS			Leidy.
maculosa	Columba domestica			B. A. I.
vesicularis	Cupidonia cupido			Leidy.
	Gallus domesticus	D. C.	Common	B. A. I.
	Meleagris gallopavo			Leidy.
	Ortyx virgianus			"
sp.	Golden pheasant	Maryland	A. H.	A. H.
OXYSOMA				
brevicaudatum	Anguis fragilis	England	A. H.	A. H.
	Rana temporaria	"	"	"
	SPELERPES RUBER			Leidy.
	STORERIA OCCIPITO-MACULATA	Maryland	A. H.	A. H.

NEMATOXYS				
commutatus	Rana temporaria	England	A. H.	A. H.
PHYSALOTERA				
A. MAMMALIA.				
turgida	Didelphys virginiana	D. C.	Common	B. A. I.
torquata	Meles labradorica			Leidy.
C. REPTILIA.				
abbreviata	Phrynosoma regale			A. M. M.
	Phrynosoma Hernandezi	Mexico		Leidy.
abjecta	Whip-snake			"
constricta	Tropidonotus sipedon			"
contorta	CISTUDO CLAUSA			"
	Kinosternon pennsylvanicum			"
mucronata	Alligator mississippiensis			"
obtusissima	BASCANION CONSTRICTOR	D. C.		B. A. I.
	B. FLAVIVENTRIS	Kansas	Williston	"
retusa	VARANUS VARIENS		Chapman	Leidy.
DIOCTOPHYME (Eustrongylus)				
affinis	SIMIA SATYRUS		Chapman	Leidy.
gigas	Canis familiaris			"
	PUTORIUS VISON			"
STRONGYLUS				
A. MAMMALIA.				
Arnfieldi (type)	Equus asinus	England	Coll. Cobbold	A. H.
Axei (type)	E. asinus	"	" "	"
contortus	ANTILOCAPRA AMERICANA	D. C.	A. H.	B. A. I.
	Bos taurus	"	Kilborne	"
	COASSUS sp.	"	C. W. S.	"
	Ovis aries	"	Common	"

SPECIES.	HOST.	LOCALITY.	COLLECTOR.	COLLECTION.
filaria	O. aries	D. C.	Curtice	B. A. I.
filicollis	ANTILOCAPRA AMERICANA	"	A. H.	"
	B. taurus	"	Curtice	"
	O. aries	"	"	"
		Blairsville	C. W. S.	"
micrurus	B. taurus	D. C.	Salmon	"
	RANGIFER TARANDUS			Leidy.
Ostertagi	B. TAURUS	D. C.	Smith	B. A. I.
	O. ARIES	Blairsville	C. W. S.	"
ovis-pulmonalis	O. aries	D. C.	Common	"
paradoxus	Sus scrofa		"	"
pusillus	FELIS DOMESTICA	D. C.	A. H.	B. A. I.
rubidus	SUS SCROFA DOM.	"	S. & H.	" (type).
simplex	Hystrix dorsatus			Leidy.
tubæformis	LEPUS SYLVATICUS	D. C.	Curtice	B. A. I.
ventricosus	Bos taurus	Common	Common	"
	Ovis aries	"	"	"
sp.	Felis catus	Texas	Curtice	"
sp.	MUS DECUMANUS	Maryland	A. H.	A. H.
sp.	LAGOTHRIX HUMBOLDTI	D. C.	"	B. A. I.
B. AVES.				
nodularis	SOMATERIA DRESSERI	Maryland	"	"
C. REPTILIA.				
sp.	BASCANION CONSTRICTOR	D. C.	"	"
CUCULANUS				
microcephalus	EMYS PALUSTRIS			Leidy.
roseus	Manouria fusca			"

KALICEPHALUS				
subulatus	Boa constrictor	D. C.	A. H.	B. A. I.
	" "	Leipsic	C. W. S.	C. W. S.
ŒSOPHAGOSTOMA				
columbianum	Bos taurus	D. C.	Moore	B. A. I.
	"	Chicago	Common	"
	Ovis aries	D. C.	Curtice	"
dentatum	Sus scrofa	"	Kilborne	"
inflatum	B. taurus	"	Curtice	"
SYNGAMUS				
trachealis	Gallus domesticus	D. C.	Common	B. A. I.
	Meleagris gallopavo	England	A. H.	A. H.
SCLEROSTOMA				
equinum	Equus asinus	England	A. H.	A. H.
	E. caballus	D. C.	"	B. A. I.
hypostomum	Ovis aries	"	Curtice	"
tetracanthum	E. caballus	"	A. H.	"
		Illinois	C. W. S.	"
STEPHANURUS				
dentatus	Sus scrofa dom.	U. S. A. (Common)	Common	B. A. I.
CHEIRACANTHUS				
horridus	Alligator mississippiensis			Leidy.
socialis	Putorius vison			"
UNCINARIA				
cernua	Bos taurus	D. C.	Kilborne	B. A. I.
	Ovis aries	"	A. H.	"
	Sus scrofa			"

SPECIES.	HOST.	LOCALITY.	COLLECTOR.	COLLECTION.
duodenalis	FELIS DOMESTICA	Mendola	Gillbach	Leidy.
radiata			Curtice	B. A. I.
trigonocephala	Canis familiaris	D. C.	Common	"
	C. LATRANS	"	A. H.	"
sp.	FELIS PARDALIS	"	"	"
PROSTHECOSACTER				
convolutus	Phocæna phocæna	England	A. H.	A. H.
inflexus	" "	Leipsic	C. W. S.	C. W. S.
minor	Delphinus phocæna		Wyman	Leidy.
FILARIA				
A. MAMMALIA.				
cervina	Bos taurus	D. C.	A. H.	B. A. I.
		Chicago	C. W. S.	"
equina	Equus caballus	Virginia	Farrington	"
gracilis	Lagothrix sp.	D. C.	A. H.	"
immitis	Canis familiaris	"	Doran	"
lachrymalis	Bos taurus	India		A. H.
obtusa Schneider	Mus decumanus	D. C.		B. A. I.
scapiceps	Lepus campestris			Leidy (type).
sp.	Cebus sp.		A. H.	B. A. I.
sp.	PUTORIUS VISON			Leidy.
sp.	FELIS CATUS			B. A. I.
sp.	Lagothrix Humboldti	D. C.	A. H.	"
sp.	Hapale rosalia	"	"	"
B. AVES.				
ardearum	ARDEA HERODIAS	Maryland	A. H.	"
attenuata	STURNELLA MAGNA			A. M. M.

cirrura	Quiscalus major			Leidy.
helicina	Plotus anhinga			"
horrida	Rhea americana			"
megacantha (Leidy, 1887)	Asio accipitrinus			"
nodulosa	Colluris ludovicianus			"
obtusa R.	Buteo borealis			A. M. M.
	Chelidon erythrogaster		Warren	Leidy.
	Dendroica occidentalis	Oregon	Jesurun	B. A. I.
obtunza	Junco hyemalis			Leidy.
	Quiscalus purpureus			"
plupalura	(?) Ceryle alcyon		Warren	"
sp.	Asio accipitrinus			B. A. I.
sp.	Cyanocitta cristata			"
sp.	Falco sparverius			"
sp.	Sturnella magna			Leidy.
sp.	Plotus anhinga	Florida	Warren	"
C. REPTILIA.				
bispinosa	Boa constrictor	D. C.	A. H.	B. A. I.
sp.	Trachemys scabra			Leidy.
D. AMPHIBIA.				
rubella	Rana temporaria	England	A. H.	A. H.
	" "	Leipsic	C. W. S.	C. W. S.
E. PISCES.				
piscium	Clupea sp. (sprat)	England	A. H.	A. H.
stigmatura (Leidy, 1886)	Salvelinus sp.			Leidy.
sp.	Fundulus Bairdi			A. M. M.
SPIROPTERA				
A. MAMMALIA.				
megastoma	Equus caballus	D. C.	Jobson	B. A. I.
microstoma	E. caballus	"	Kilborne	"
reticulata	Bos taurus	"	Smith	"
strongylina	Sus scrofa	"	Common	"

SPECIES.	HOST.	LOCALITY.	COLLECTOR.	COLLECTION.
B. AVES.				
uncinipenis Mol.	Rhea americana			Leidy.
quadriloba	HYLOTOMUS PILEATUS			"
DISPHARAGUS				
anthuris	CORVUS AMERICANUS	D. C.	A. H.	B. A. I.
gasterostei	GASTEROSTEUS ACULEATUS	Leipsic	C. W. S.	C. W. S. (type).
GONGYLONEMA (Myzomimus)				
scutatum	Bos taurus	D. C.	Common	B. A. I.
	" "	Chicago	"	"
DRACUNCULUS				
medinensis	Homo	West Africa	Burtt	Leidy.
TRICHOCEPHALUS				
affinis (?)	AUCHENIA LAMA			Leidy.
affinis	Bos taurus	D. C.	A. H.	B. A. I.
affinis (?)	Camelus bactrianus			Leidy.
affinis	Ovis aries	D. C.	C. W. S.	B. A. I.
crenatus	Sus scrofa	"	Common	"
depressiusculus	Canis familiaris	"	"	"
unguiculatus	LEPUS SYLVATICUS	"	Curtice	"
	L. timidus	Leipsic	C. W. S.	C. W. S.
sp.	ORYX LEUCORYX	D. C.	A. H.	B. A. I.
		Pennsylvania	Dolley	Leidy.
sp.	ERYTHRIZON DORSATUS			A. M. M.

TRICHOSOMA				
A. MAMMALIA.				
sp.	Mus decumanus (liver)	D. C.	A. H.	B. A. I.
sp.	" " (duodenum)	"	"	"
sp.	" " (vesic. urin.)	"	C. W. S	"
sp.	PUTORIUS VISON	Maryland	A. H.	A. H.
B. AVES.				
longicolle	Tetrao urogalli	Leipsic	C. W. S.	C. W. S.
picorum				Leidy.
tenuissimum	Zenaidura carolinensis	Florida	Warren	"
sp.	AMODRAMUS PASSERINUS	Maryland	A. H.	A. H.
sp.	BUBO VIRGINIANUS	"	"	"
sp.	BUTEO BOREALIS	"	"	"
sp.	CARDINALIS CARDINALIS	"	"	"
sp.	COCCYZUS AMERICANUS	"	"	"
sp.	Columba domestica	D. C.	"	B. A. I.
sp.	CORVUS AMERICANUS	Maryland	"	A. H.
sp.	Gallus domestica	D. C.		B. A. I.
sp.	MEGASCOPS ASIO	Maryland	A. H.	A. H.
sp.	MOLOTHRUS ATER	"	"	"
sp.	PIPILO ERYTHROPHTHALMUS	"	"	"
sp.	PIRANGA ERYTHROMELAS	"	"	"
sp.	QUISCALUS QUISCULA	"	"	"
sp.	TURDUS MUSTELINUS	"	"	"
sp.	VIREO FLAVIFRONS	"	"	"
sp.	V. OLIVACEUS	"	"	"
C. REPTILIA.				
sp.	BOA CONSTRICTOR	D. C.	"	B. A. I.
TRICHINA				
spiralis	Homo			B. A. I.
	Lepus cuniculus (int. and musc. infection)	D. C.	C. W. S.	"
	Sus scrofa	Chicago	Melvin	B. A. I.

SPECIES.	HOST.	LOCALITY,	COLLECTOR.	COLLECTION.
RHABDONEMA				
nigrovenosum	BUFO LENTIGINOSUS	D. C.	A. H.	B. A. I.
"	Rana temporaria	Leipsic	C. W. S.	C. W. S.
TROPIDOCERCA				
paradoxa	DIEMEDEA EXULANS			Leidy.
unispina	CORVUS AMERICANUS	D. C.	A. H.	B. A. I.
sp.	ACCIPITER VELOX	Maryland	"	A. H.
sp.	BUBO VIRGINIANUS	"	"	"
sp.	COCCYZUS AMERICANUS	"	"	"
sp.	COLYMBUS AURITUS	"	"	"
sp.	DAFILA ACUTA	"	"	"
sp.	GALLUS DOMESTICUS	"	"	"
sp.	PORZANA CAROLINA	"	"	"
sp.	QUISCALUS QUISCULA	"	"	"
sp.	RALLUS VIRGINIANUS	"	"	"
sp.	ŒDEMIA DEGLANDI	"	"	"
DACHNITIS				
sphærocephala	Accipenser sp.	England	A. H.	A. H.
? MONOPETALONEMA				
eremita	Meles labradorica			Leidy.
ATRACTIS				
subulata =	CYCLURA BASOLOPHA	New Providence		Leidy.
opeatura				" (type).

AGAMONEMA				
capsularia	Alosa sapidissima			Leidy.
	Clupea harengus			"
	C. SAPIDISSIMA			"
	GADUS CALLARIAS			"
	SERRANUS ATRARIUS			"
	STROMATEUS TRIACANTHUS			"
piscium	COREGONUS CLUPEIFORMIS			A. M. M.
MERMIS				
albicans	Apple			Leldy.
nigrescens		Leipsic	C. W. S.	C. W. S.
sp.	Grasshopper			Leipsic.
GORDIUS				
aquaticus	Blatta sp.			A. M. M.
lineatus		New York	Baird	Leidy.
robustus		Kansas	Hammond	"
"		New Jersey		" (type).
varius		Pennsylvania		"
sp.		Montana	Coues	"
sp.	Clepsine	Rhode Island		"
sp.				"
sp.		Africa	Nassau	"
sp.		Pennsylvania		"
sp.		North Carolina		"

A number of other undetermined species in Coll. Leidy. Eight bottles of *Gordius* and *Mermis*, belonging to Bureau of Animal Industry, have been loaned to Dr. H. B. Ward, of Lincoln, Neb.

V. ACANTHOCEPHALI.

SPECIES.	HOST.	LOCALITY.	COLLECTOR.	COLLECTION.
ECHINORHYNCHUS				
A. MAMMALIA				
capitatus	GLOBICEPHALUS SVINEVAL	Italy	Parona	C. W. S.
pellucidus	MESOPLODON SOWERBIENSIS		Curtice	B. A. I.
moniliformis	SCIURUS NIGER			Leidy.
gigas (adult, larva)	Sus scrofa dom.	Common	Common	B. A. I.
	LACHNOSTERNA ARCUATA	D. C.	C. W. S.	"
sp.	DASYPUS 9 CINCTUS	Texas	A. H.	"
B. AVES.				
caudatus	Strix nebulosa			Leidy.
globocaudatus	Ulula aluco	Leipsic	C. W. S.	C. W. S.
hystrix	STRIX NEBULOSA			Leidy.
polymorphus	SOMATERIA DRESSERI	D. C.	A. H.	B. A. I.
striatus	ARDEA HERODIAS			Leidy.
	Tantalus loculator			"
versicolor	ANAS DOMESTICUS	England	A. H.	A. H.
sp.	ARDITTA EXILIS	Maryland	A. H.	"
sp.	BOTAURUS LENTIGINOSUS	"	"	"
sp.	" "	"	"	"
sp.	COLAPTES AURATUS	"	"	"
sp.	CONTOPUS VIRENS	"	"	"
sp.	ELANOIDES FORFICATUS			Leidy.
sp.	PORZANA CAROLINA	Maryland	A. H.	A. H.
sp.	Plotus sp.			Leidy.
sp.	QUISCALUS QUISCULA	Maryland	A. H.	A. H.
manifestus (Leidy)	SCOLAPTES MEXICANUS = ? Picus collaris			Leidy.
sp.	RALLUS ELEGANS	Maryland	A. H.	A. H.
sp.	SOMATERIA DRESSERI	"	"	B. A. I.
sp.	STURNELLA MAGNA			Leidy.

C. REPTILIA.				
hamulatus	EMYS PALUSTRIS			"
	E. TERRAPIN			"
	TRACHEMYS SCABRA			"
D. AMPHIBIA				
hæruca	Rana	Leipsic	C. W. S.	C. W. S
sp.	DIEMICTYLUS VIRIDESCENS	Maryland	A. H.	A. H.
sp.	R. temporaria	England	"	"
E. PISCES.				
acus	Gadus morrhua	England	A. H.	A. H.
angustatus	ESOX RETICULATUS			Leidy.
proteus	Accipenser sp.			"
	Anguilla vulgaris	England	A. H.	A. H.
	ROCCUS LINEATUS			Leidy.
socialis	PLEURONECTES AMERICANUS			"
tuberosus	ESOX RETICULATUS			"
sp.	Ambloplites rupestris	Lake George		"
sp.	Anguilla vulgaris	England	A. H.	A. H.
sp.	A. vulgaris	Maryland	"	"
sp.	COREGONUS ALBUS			Leidy.
sp.	C. HOYI		Gurley	A. H.
sp.	ESOX AMERICANUS	Maryland	A. H.	"
sp.	E. RETICULATUS	"	"	"
sp.	FUNDULUS DIAPHANUS	"	"	"
sp.	Gadus morrhua	England	"	"
sp.	MICROPTERUS DOLOMIEU	Maryland	"	"
sp.	" "	D. C.	A. H.	A. H.
sp.	" "			Leidy.
sp.	MORONE AMERICANA	Maryland	A. H.	A. H.
sp.	SALVELINUS NAMAYCUSH	Lake Ontario	Fairman	Leidy.
sp.	Tutta sp.	D. C.	A. H.	A. H.
sp.	T. sp. (sea trout)	Maryland	"	"

VI. LINGUATULINA.

SPECIES.	HOST.	LOCALITY.	COLLECTOR.	COLLECTION.
LINGUATULA				
rhinaria	Bos taurus	D. C.	Schroeder	B. A. I.
(serrata)	Oryx leucoryx	"	A. H.	"
	Lepus cuniculus	"	Curtice	"
	" "	"	Kilborne	"
	" "	Leipsic	Coll. Leuckart	C. W. S.
(tænioides)	Canis familiaris	England	A. H.	A. H.
POROCEPHALUS (Pentastoma)				
(crotali subcylindricum)	Dasypus 9-cinctus	D. C.	A. H.	B. A. I.
	Didelphys virginiana	"	"	"
	Mephitis mephitica	Florida	Baker	Leidy.
	Mus musculus	Leipsic	C. W. S.	C. W. S.
(proboscideum)	Bascanion constrictor	"	"	"
		"	"	B. A. I.
	Boa constrictor	Leipsic	"	C. W. S.
	" "	D. C.	A. H.	B. A. I.
	Crotalus adamenteus			Leidy.
euryzonus	Cercocebus fuliginosus			"
gracile				"
oxycephalus			Coll. Wien	C. W. S.
sp. (larva)	Erythrizon dorsatus			A. M. M.

(To be continued.)

ON THE PRESENCE OF DISTOMA WESTERMANNI IN THE UNITED STATES.

By Henry B. Ward, Ph. D.
University of Nebraska, Lincoln, Neb.

Last June a piece of the lung of a cat was brought me for examination, as it contained some foreign bodies which were unknown to the finder. A cursory examination showed them to be *Distomida*, and more careful study seemed to confirm the first impression that in spite of a few slight differences, they were specimens of the Asiatic *Distoma Westermanni*. Being somewhat in doubt and not having the literature at hand, I sent several to Dr. C. W. Stiles, helminthologist of the Bureau of Animal Industry at Washington, D. C., who wrote that there was no doubt in his mind of the identity of the two. For his kindness in this and in sending me the synonymy of the species, I desire to express to him my sincere thanks. I am likewise much indebted to Mr. W. A. Kickland, assistant in the Zoological Laboratory of the University of Michigan, for his kindness in turning over to me the specimens which he found.

The cat, from which the worms were taken, was obtained in Ann Arbor, Mich., and had lain some time in fifty per cent alcohol, while being dissected. In consequence the worms were badly macerated, but, after hardening in alcohol, proved to be sufficient for the determination of almost every organ. Some were mounted whole, and one, after being sectioned, was graphically reconstructed so that the gross anatomy of the form was very clear.

In the small portion of the lung, which was preserved, about a dozen specimens were found. They appeared to be embedded in the tissue which had been partly dissected away. Owing to the poor condition of the organ, it was impossible to determine the exact position of the parasites, but it can be asserted positively that they were not at the surface. The alcoholic specimen of the worm was a dark steel gray at the edges, with a lighter band down the centre; the black dendritic processes of the vitellaria (brown by transmitted light) were distinctly seen with a hand-lens at the margin of the darker area. In

form the worms were naturally very irregular, but were distinctly flattened, not oval, the cross section being an elongated ellipse. In size the seven measured varied from 11.2 x 4.8 mm. to 15.7 x 7.3 mm., averaging 13.6 x 5.8 mm. I think that the five sent Dr. Stiles were somewhat smaller.[1] The average size, however, considerably surpasses the extreme given by Leuckart[2] for *Distoma Westermanni*. The oral sucker was so distorted that measurements were only approximate; it varied from 1 to 1.4 mm. in diameter. The ventral sucker varied from 0.75 to 1 mm. in diameter, being on the average 0.84 mm. It will be noticed not only that the average here also surpasses the extreme given by Leuckart (p. 405) "höchstens 0.75 mm.," which may be explained on the basis of the greater total size of the worm, but also that the oral sucker is appreciably larger than the ventral, which is the direct contrary of the conditions in *Distoma Westermanni* (Leuckart, p. 409). Too much weight should not be laid on these points in view of the condition of the material and still more in the light of the exact correspondence in internal anatomy to be described.

No spines were found on the cuticula, which is not strange after the long maceration. The pharynx, the very short œsophagus and the forked intestine agree exactly with the description given for these organs in *Distoma Westermanni*. The prominent excretory pore and the large sinus show also striking similarity. It is the sinus which is the cause of the light band along the centre of the alcoholic specimen already noted.

In the reproductive organs the agreement is equally striking. The two lobate testes, in the posterior third of the body, the straight vasa deferentia, the absence of a cirrus, the location of the sexual pore on the ventral surface a little behind the acetabulum, the enormous vitellaria, which lie just under the surface over almost the entire body, the prominent vitelline ducts and ovary, the condensed coil of the uterus and the well-developed Laurer's canal rising obliquely to the dorsal surface, are all points which agree in detail with the structure of *Distoma Westermanni*. The eggs vary from 96 x 48 μ to 118 x 50 μ with an average size of 102 x 53 μ. This again shows a slight variation from the

[1] These are now in the collection of the Bureau at Washington.

[2] R. Leuckart, Parasiten des Menschen, 2 Aufl., Bd. 1, p. 404-8.

figures given by Leuckart (p. 436), for the eggs of *Distoma Westermanni*, *i. e.* 80 x 56 μ. The eggs of the two agree, however, in that in both a cover is present.

In spite of the considerable differences in size already noted, the exact agreement in internal anatomy compels one to recognize the identity of this form with the Asiatic Distoma for which the name *Distoma Westermanni*, Kerbert (1878), has evidently the prior right.

Several important questions suggest themselves in this connection, and first of all as to the source of the infection. The cat was a wanderer; of its antecedents nothing could be ascertained, and nothing was known of its ante-mortem conduct. That it was imported into America by some Chinaman is of course possible, since cats are highly esteemed as pets by that race; and the large number of Chinese in the United States render this not so remote a possibility as appears at first glance. In that case infection undoubtedly took place before the animal left the East. Even if this be true, the discovery is a matter of moment because it is evident that, if a secondary host can be found in this country, a dangerous parasite may become fixed in our land as the result of such importations. If, on the other hand, the infection did not take place in the East, it must be that a secondary host has been found here already and that the parasite has gained a foothold in this country. The manner of its introduction is then a matter of conjecture merely. Among the numerous Chinese on our shores, there have been no doubt some who, in the light of the prevalence of the disease in the East, have brought the parasite with them. The eggs distributed in their travels have served to introduce the embryos, which in some place have found the conditions necessary for development. There is no need of emphasizing the importance of obtaining accurate knowledge as to the extent of the infection among animals, and even man, where confusion in diagnosing the complaint is probable unless the sputa be subjected to microscopic examination. It is hoped that by directing attention of scientific men to this find, further evidence on the subject may be obtained; but it is clear that this single case can not be accepted as proof of the *establishment* of the parasite in this country.

Supplementary Note by Dr. C. W. Stiles.—The above article appeared in German in the C. J. B. v. P., vol. XV., Nos. 10–11, pp. 362–364, but as the author did not have an opportunity to read proof several typographical errors in the measurements unavoidably crept into the journal. On this account, and on account of the extreme importance of this find by Dr. Ward, I have requested him to furnish an English copy of his article to be published in one of the American journals. As the worm appears now for the first time in American literature, I take the liberty of adding a short note to Dr. Ward's very suggestive communication.

This parasite was found in the Japanese, by Bälz in 1878, who however did not recognize its true nature, but believing that the eggs which he found in the sputa were protozoa, named (1880) the structures *Gregarina pulmonalis* s. *fusca*. Manson also found the eggs of the parasite in Amoy, and afterwards obtained a specimen of the worm which Ringer had found in *Formosa*. Cobbold then obtained this specimen and described it as *D. Ringeri*. The parasite was afterward studied by several authors, notably by Leuckart, who discovered to his astonishment that the form was identical with one which Kerbert had found in the lungs of a tiger (*Felis tigris*) in Amsterdam.

Now that Ward has found this same worm in an American cat, it may be well to give a short zoological description of the worm, with synonymy, etc, at this time in order to place American physicians and veterinarians on their guard for its possible occurrence in the lungs of their patients.

Most zoologists classify the worm in the genus *Distoma* but Monticelli (1888) has created a new genus *Mesogonimus* in which it must be placed, should this genus prove to be well established—a point upon which helminthologists are not yet united. The genus *Mesogonimus* is based upon the position of the genital pore, which is *posterior* to the acetabulum. The synonymy and specific diagnosis of the worm are as follows:

Distoma (*Mesogonimus*) *Westermanni.*

1878. *Distoma Westermanni* Kerbert.
1880. *Greggarina pulmonalis* s. *fusca.*
1880. *Distoma Ringeri* Cobbold.
1881. *Distoma pulmonis* K. S. and Y.
1883. *Distoma pulmonale* Bälz.
1890. *Mesogonimus Westermanni* Rail.

Length eight to ten millimetres, breadth four to six millimetres; body thick, plump, reddish brown (fresh) to slate (preserved) in color, oval to elongate in form, rounded anteriorly, somewhat more attenuated posteriorly. Oral sucker small (0.75 millimetres), subterminal; ventral acetabulum slightly larger and situated slightly anterior to the middle of the body. Cuticle covered with broad scale-like spines. Genital pore immediately posterior to acetabulum, near the median line. Oesophagus very short, so that the bifurcation of the intestine is considerably anterior to acetabulum; intestinal cæca run irregularly some distance from each other to the posterior extremity.

Male organs: Cirrus and cirrus-pouch absent; ductus ejaculatorius straight; testicles tubular, ramified, nearly symmetrical, situated in the posterior portion of body.

Female organs: Ovary ramified, lateral, somewhat posterior to acetabulum; on the opposite side of the median line at about the same height is situated a lobate shell-gland and a rather short, massed uterus, the folds of which extend ventrally of the shell-gland; vitellogene glands lateral, well developed, extending from the anterior to the posterior extremity; vitelline reservoir large; Laurer's canal present.

Eggs oval, (0.08 to 0.118 millimetres long by 0.048 to 0.053 broad,) yellow and with thin shell. Miracidium, ciliated, develops after eggs escape from their host. Sporocyst, redia and cercaria not known.

Hab.—Lungs of man, cats, tigers and dogs.

For details of pathology, symptoms, etc., the reader must be referred to the special literature on the subject, but the following brief summary taken from Railliet's new Traité de Zoologie Médicale et Agricole (1893–94) may be interesting to those who have not access to these works.

"This worm is found in the small bronchi or in cysts situated at their periphery. The cysts in question attain the size of a nut; they contain a reddish material formed of mucous, blood-corpuscles, débris of lung-tissue, and the distomes; their wall is indurated and they communicate with the bronchi only through small orifices by means of which the eggs escape.

"Individuals infested with these parasites show certain symptoms which may be summarized as follows: cough light or absent; sputa bloody, and slightly yellowish on account of

the presence of the brown egg-shells; occasionally hæmorrhages which continue irregularly during several years. This affection, known as "parasitic hemoptysie," or simply pulmonary distomatosis, seems to be quite common, especially in Formosa—where fifteen per cent of the population are affected with it—and in Japan. It does not appear to be incurable, but seems to be serious only in exceptional cases."

A microscopic examination of the sputa will reveal the presence of the fluke eggs and thus give a positive diagnosis.

Washington, D. C.

LIFE AND DEATH.

By Dr. W. H. Gribble.[1]

When our worthy president requested us to prepare a paper to be read at this meeting, we asked, "What subject?" His answer was, "Anything, only do not make it too lengthy." Presuming from past experience that enough will be said on colic, azoturia, parturient apoplexy, etc., we prepared this paper, its subject being suggested by the remark of a friend, "In the midst of life there is death."

Ever since man first began to have thought up to the present time when all men coin thought both from pleasure and necessity, the problem of life has presented itself; yet its solution is no nearer than when discussed by the most ancient of philosophers. The question is the more imperative when death, the opposite of life, presents itself in all its hideous features; when those bound to us by the ties of affection or by the unity of blood lie speechless, passionless before us; when the thousand and one visible acts that make up a life of usefulness or with busy fingers knit the drapery of love, and the tens of thousands of invisible and silent operations that carry on this wonderful complex machine (called the human), have come to a sudden pause. Of all the many attributes, beauty, intelligence, ever-changing graceful motion, and all the indescribable attractions that made the light of our lives, only a mute form is left to distinguish us from any other decomposing organic matter.

To us, our departed friend might be a model of potter's clay, or, like the Italian patriot, be petrified into the granite rock, for it was not the complex system of levers that make up the muscular system, nor the bundles of sarcode cells that endowed the same with contractibility; nor yet the complicated series of tubes that convey the blood to every ultimate particle of the economy; neither was it the fine lines and knotted ganglion of the nervous system that convey sensations, transmit messages and register impressions both internal and external; with none of these had we any acquaintance. Of all we knew we find left nothing but an

[1] Read before the Ohio State Veterinary Medical Association.

attribute that the process of decomposition will soon destroy and which can be as truly transferred to a bit of paper by the chemical action of the sun's rays or fixed indelibly in the rock by the artist's chisel.

We call it lifeless; why not add personless? For, as we have tried to show, of the personality that we knew nothing is left except form, and that belongs as truly to a photograph or a marble statue.

We say that life has left that form, but it has not; only the higher individual life has given way to a lower order; for the higher life has no sooner ceased than the germs of much simpler forms take on active life and tear down the nobler fabric in order to build up their own structure; just as some great ruin of the past furnishes material for thousands of smaller edifices. There are millions of germs, bacteria, etc., in the fluids of the economy, waiting for a favorable opportunity to develop. Instead of a body decomposing into noxious forms to spread disease at all times, it is gently lowered through inferior grades of life, until it becomes brother to the cold rock and lifeless clay. So intense has been the anxiety of our race from the earliest ages to comprehend the mystery of existence in order to prolong life that men of mighty intellect have spent their energies in seeking means to attain perennial youth. The alchemist sought the philosopher's stone, the physician the elixir of life, the soldier his eldorado and the poet the fountain of perpetual youth. In such wild chimeras as these, has the intense longing of man for the continuance of life broken forth, and this desire finds expression to-day in the endorsement of every nostrum brought out to cure disease. Can this eager hope of man be gratified? We interrogate modern science for an answer.

The principal elements from which all organic bodies are constructed are four in number: Oxygen, hydrogen, carbon and nitrogen. These are brought together under the influence of vital forces to form an organic cell which is naught but a mass of jelly-like matter termed plasma; without definite form if young, and when older, surrounded by an envelope, its form is determined by its condition and varies largely, if solitary, but, if fixed in a structure, it changes but slightly if at all. This simple agent is the brick, so to speak, from which all organic edifices are built.

In the lowest forms of life a single cell constitutes the whole being, while in the higher organism incalculable numbers are required in their structure; for to produce a smile, the action of millions of muscle cells are needed. With the simpler organisms there is no division of labor; it does everything for itself, being at one time all stomach, all everything that the necessities of its life demands. In the higher forms, the division of labor is largely carried out, one set of cells forming a frame work, bone cells, etc.; another set forming muscles to act on the levers of the skeleton in obedience to the command of the nerve cells. So another set of cells separate materials from the circulating fluid which are needed in the economy, while others separate those which are not needed.

The contents of these cells vary in density from being slightly thicker than water to the hardness of ivory. If a young vegetable cell taken from a fresh leaf while under the action of sunlight be placed under a microscope, its contents would be seen in rapid motion, currents circulating in all directions, crossing and recrossing too rapid to be followed and in less space than a pin's head.

Now if this cell could be watched from day to day the envelope formed by a hardening of its exterior would be seen to become thicker and thicker until it

became opaque, its currents slower and slower until they stop, and the whole cell be solid and contract, and as far as its individual life as a cell is concerned it is dead. In the vegetable cell (as a rule) the chemistry is simpler than in the animal cell, nevertheless as the cell is nature's organic laboratory the study of one will assist that of the others. The most essential factor of life is a circulating fluid which may be simple or complex in accordance with the complexity of the organism it supplies, the cell selecting from it just such substances as it needs. The activity of cells depend on their age, being rapid if young; but as they grow older their walls thicken their activity decreases. Why do the bones become hard, the muscles stiff and the nervous system less sensitive in the old? Because the individual cells of these parts have become hardened and in many of them their activity has entirely ceased; so it is clear that for an active life, a rapid circulation and active cells with contents soft enough to undergo quick changes are needed; for life decreases with the hardening of the cells or the slowing of the circulation and ceases altogether with the latter. Life then, is that continuous movement within the soft portion of the cell which occurs under the influence of nutritious stimulation; consequently, if the cell is entirely hardened, its life ceases, and if partly hardened its life is in proportion to the plasticity of its centre and the facility with which it obtains nutrition.

It may be inferred from this that in every living body there is a dead part and a living part. This is true, for all of the hair outside the bulb, all of the nails outside the matrix, all of the epidermic skin, in fact, a large portion of the whole body, in proportion to the age, is dead, while in the dead the hair and nails continue to grow under favorable circumstances for years. If part of an organism can be dead and still have its integral existence and part be living and yet have lost that integrity, what is it that constitutes life and death? The life of an organism consists of the definite combination and movement of the individual cells, acting harmoniously and responding to stimulation affecting the whole by which the machinery of the organism is carried on; as long as these acts are maintained, the individual lives, though the cells be largely dead. The individual must die, though every cell be alive, whenever this co-ordinated combination ceases.

The most essential agent for the proper co-ordination of all animal cells is oxygen; in its absence, a person will die in three minutes. It is taken up by the cells and carbon dioxide is given off; the more active the animal the greater the amount required. A butterfly consumes more oxygen than a toad. The anxious orthodox who, knowing that all organic matter dies, has fashioned for himself a life after death might pertinently inquire whether, when this definite combination of cells is perverted and discord takes the place of harmony, this is the termination of life. We can only say with Hubbard Kernan,

"If I thought as you thought, my brothers, if I believed in a better sphere
Beyond the grass and the golden lilies that blossom o'er dead men here,
I would tingle with strange, great gladness whenever a friend of mine should die,
I would robe him in festal raiment and I would kiss him a glad good-bye,
And oh! when unto me comes the hour—the miracle hour that comes to all—
Never a cypress branch or blossom should throw its gloom on my gorgeous pall,

For at my funeral should be dancing; and dainty feasting at festal board;
And singing and jest and laughter and gurgle of wine in the glasses poured,
And jubilant bells should rock the steeples when I was borne to the gay bright grave,
And rattle of drums and trill of trumpets blend in a glad thanksgiving stave."

Whither we go we know as little about as we know whence we came or why we are here. The enigma of life has not been and probably never will be solved; for we may rest assured that while science may increase our worldly comforts and lessen the labors of life, it can never solve the why's and how's of cell life, and anyone not satisfied with this solution must invent a scheme of future life to suit his wants or take one of those invented by others, as science gives no other or further explanation.

VALEDICTORY ADDRESS.

By George R. Flowers, M. D. C.[1]

In the Art Gallery of the late Columbian Exposition, where the muses held their court, and were treated in stone, bronze and oil, there was one statue more weird, more impressive, and more startling than all. The Hippocentaur--half man, half horse. It faced a main entrance, through which surged the populace for several months. From many it received scarce a glance. Some looked and smiled, others frowned. But as the eyes of the intelligent student of mythology swept its massive outline, and his mind conjured up the physical and mental possibilities of the combination, the profoundness of the old Grecian philosopher transfixed and startled him.

It is the commonest figure in Grecian art. The Athenian master made it his triumph. It was the inspiration of the novice, the embodiment of a strange fable, you may say, the result of idle fancy or barbaric imagination.

No, ladies and gentlemen, Grecian art is too comprehensive. Mythology is not crude, but profound. Its figures which have been carried down through ages and embodied in stone, in painting and in song, are not the result of idle fancy, but are the result of philosophic and penetrating minds. These old philosophers recognized the horse as man's best friend, and the first subjugation of nature and nature's forces they ascribed to a combination of the two—hence the figure. The combined efforts of all the writers and orators of the century could not pay a grander tribute or draw a more impressive delineation of the mutual dependence, the mutual fealty, existing between man and horse. Of marvelous fertility were the minds of this fabled race. They were skilled in the art and the sciences, and practiced medicine with marvelous results. A descendent of the race, Chiron of Thessaly, achieved a reputation for the successful treatment of various ailments of equines, that was limited only by the then existing bounds of civilization. Tradition states, and is supported indisputably by the historical records we have of that time, that

[1] Read at the Chicago Veterinary College Commencement Exercises, March 22, 1894.

Æsculapius journeyed to Chiron and induced him to become his tutor. Therefore the founder of the modern school of medicine, the patron saint of our brother M. D. had for his preceptor a veterinarian.

Ladies and gentlemen, we claim priority; we are the originators, the fountain head of the science of the application of remedial agents for the alleviation of disease. Following Chiron of Thessaly came Erictheus, a young Greek, who achieved considerable reputation in the treatment of equine disorders. Xenophon, Simonides, of Athens, Varro, Columella, and others were students of the art practitioners and authors who have left us records of their experiences. Magus, a Carthagenian, about 400 years B. C., collected, recompiled, and published their works in twenty-eight volumes. Hippocrates, who lived about this time, is considered the ablest of the early authors, and is to-day referred to as the father of medicine. He devoted his work equally to man and horse, and it may be a matter of interest to some to know that the literal meaning of his name is horse force. Really it is a matter of difficulty to separate the early history of the medical profession from man's best friend. Three hundred years after Christ, the works of previous authors were again revised by Vegetius, another Greek disciple of Chiron. The decline of Athens, and the social and intellectual supremacy of Rome which followed, naturally transported the profession westward, and proud and honored was the position occupied by the veterinarian. His rank in the Roman army was recognized, and the foremost titles and honors of the land were conferred upon him. Not in Rome alone was the veterinarian appreciated—the Merovingian kings of France conferred upon their veterinarians the highest rank in the land, viz.: that of "Constable," while the Normans conferred that of "Marshal." There accompanied William I to England a family highly skilled in the healing art as applied to the equine, and he held them in such appreciation as to create for them the present title of "Farriers." But henceforth for several hundred years the horizon of the veterinary profession assumed a very sombre tint. No sparkling star of intelligence served to illuminate its background. It seemed as if the mass of superstitious rubbish which had attached itself to it like barnacles, would eventually engulf it. But the good endureth, and, Phœnix-like, out of the ashes of ignorance and superstition the profession has once more sprung with advancing steps, greater than ever displayed by any other, until once more to-day it holds in the minds of the intelligent portion of the public the proud position it occupied in the days of Aristotle and Alexander. I submit to you, gentlemen: Can the public, in the face of so old and honored a history, apply to a profession so noble in its imports and designs, the disapprobative term of "a horse doctor?" Mythology, tradition, legend, history past and present, and the prophecies of the future, lead in a manner which cannot fail to impress the bluntest perceptions with the grand mutual co-operative obligation existing between man and horse—their inseparable fealty and mutual dependence.

"If God created man, then the horse was created next to him," said William I, as he viewed the bloody field of Hastings; the victory being due to his Norman horsemen. "Gone to the dogs," is a very common expression, and we will admit that men have gone there; but the fact is self evident that the dog has not become contaminated by the association, but remains to-day the personification of courage, faithfulness, sterling integrity and honor.

But what of the present and future of the profession? In all European countries the veterinary colleges are supported and controlled by the government, and rank equally with their medical universities. Their graduates are given positions of importance in the army and on the health boards. England ranks her veterinarians as colonels, majors and captains, an example followed by France and Germany. Our great government, I am sorry to say, has been negligent in this matter, and it is to be regretted that the profession has not been accorded the recognition it is deserving of. Prevention of disease and protection of human life are far more important than the treatment of disease. Nearly all the contagious diseases are transmissible from animal to man, and here the veterinarian stands as a safeguard to public health, seeking out, isolating and checking the ravages of disorders of the most dangerous types. Legislative action is now being taken by several of the States aiming at complete and thorough veterinary inspection of all animal food and dairy products, so that without encroaching upon the honored position of the physician as the alleviator of disease, we will still be granted opportunity to demonstrate our ability as preventors. The late Mr. Charles Darwin in his great work "The Descent of Man," delineates with wonderful accuracy the similarities of many of the attributes, actions, fancies, lives and dispositions of man and the brute creation. Sympathy and its twin brother, the humanitarian sentiment, are, in his opinion, the highest attributes of the human family, that which chiefly distinguishes us from the lower animals. If this be so let us cultivate, cherish and guard religiously the attribute, and as civilization and the race advance we can confidently look forward to the time when the sick and injured animal will be treated with the same care and by as intelligent physicians as the sick man, and in those perverted natures from which have become eradicated, or never existed, human kindness sufficient to prompt them to care for the dumb creatures placed within their power, human cupidity will cause a response. Twenty millions of dollars is a low estimate of the value of the live stock of this country. In fact, it is a matter of great difficulty for the mind to comprehend the vast amount of money the people of this country have invested in this interest. From an aspect purely financial, irrespective of any humane duties, the men who guard this vast wealth from dangerous and devastating plagues and diseases, as well as minister to the animals scientifically, should be entitled to the respectful approbation of an intelligent and appreciative public. But, what of that rapidly disappearing genus "the horse doctor," whose principal occupation was dealing in or trading horses? He still exists in some rural districts, and as a usual thing is slovenly, profane, occasionally dissipated, and at all times bearing the imprint of undeniable seediness. Certainly his assumption of the title, his dense ignorance and the mass of superstitious rubbish with which he surrounds his vile nostrums, have brought discredit upon the profession. What shall our action be in regard to him? We will treat him kindly, in fact considerately; and, although not associating with him, we will not antagonize or legislate against him. It is absolutely unnecessary. The philosophers and scholars of to-day have universally accepted that great natural law first presented by Mr. Darwin, "the survival of the fittest." This law is particularly applicable to the horse doctor. Nineteenth century advancement and intelligence have assured us our position in the scientific world and the public mind.

We now stand upon the threshold of our chosen work; a profession which appeals directly to the noblest attributes of the human mind; one that antedates all others, older than the oldest. It has risen to the highest pinnacle of fame, and been sunk to the lowest status of ignorance by the various cataclysms chronicled by the tradition and history of the races. A profession that has passed through trials and epochs that would have eradicated from the face of the earth one with less of the noble in its imports and purposes. We enter upon it to-day confident in our ability and pledged in our intentions to leave it further advanced than we found it. We will study, investigate, and read for ourselves, for in the language of Professor Huxley, "when science adopts a creed, she commits suicide." Let us strive for the approbative guilt right of the public, as firmly and untiringly as we did for the guilt right in the old dissecting room.

EDITORIAL.

PRIOR to the founding of the first veterinary school at Alfort in 1762 the veterinary art was practiced by men who received no special training for their work. Some of them were intelligent horsemen, some were physicians, some soldiers, some farriers, and some utterly unreasoning and unprincipled empirics. It was evident that better talent was needed by the army and by agriculturists, to protect horses and other live stock from the ravages of the numerous diseases then prevalent. When the subject of a grant of a large sum of money for the Alfort school was brought to the attention of the French Government by Bourgelat, the scheme was readily accepted, because the necessity for a school of the sort proposed was very evident. In fact, the need was so urgent and so thoroughly appreciated that every civilized country in Europe delegated men interested in the diseases of animals to attend the lectures and instruction given at the Alfort school, and within a few years these delegates had established veterinary schools in all of the chief cities of the continent.

Every veterinary school in Europe has been supported by more or less liberal appropriations from the general government. This is because it has been recognized that it is within the power of the veterinarian to prevent the fearful losses that formerly prevailed among the horses of the armies, and because without veterinary supervision of farm animals agriculture would, in most of these countries, be unprofitable. The latter is by far the more important factor in connection with the establishment and continued support, on the part of the government, of the veterinary schools. At the time of the establishment of the first school, Europe was overrun with rinderpest, lung plague, foot and mouth disease, anthrax and glanders. The diseases prevailed to such an extent that farmers in some districts were utterly unable to breed or to keep live stock. The commissions of agriculturalists and physicians that had previously been appointed, by royal decrees, and instructed to study these diseases and formulate rules for their control and

extermination, had utterly failed, and the diseases were becoming more prevalent every year.

What a change took place after the veterinary schools were established and veterinary knowledge, dug out, incubated and fostered in these schools, had been scattered through the medium of their students and graduates! Methods of prevention were discovered and perfected, so that before a great many years had passed the breeding of live stock became possible in districts that were formerly thought to be hopelessly infected.

The system of control of contagious diseases of animals in Europe has, ever since 1800, been, in general, as follows: A chief veterinarian is appointed, who has under him department, district and local veterinarians who make inspections, proclaim quarantines, order disinfection and condemn animals or treat them as the circumstances may require. This system has been eminently successful; it has not only rid most of the civilized countries of Europe of devastating plagues that formerly decimated the herds and flocks, thereby making agriculture unprofitable, but it has also been the means of placing the veterinary profession and the veterinary schools on the high level that is maintained in these countries. Without government support and army and civil appointments, the veterinary profession in Europe would have had a slow and stunted growth, but because the veterinarian and his work have been appreciated by the military and civil authorities, veterinary science and veterinary art have thrived and prospered until they are on a par with the science and art of medicine. We have a striking illustration of this in the history of the veterinary profession of Great Britain. The first veterinary school in England was established by Saint Bel in London in 1790. It was a semi-private venture and received no direct support from the public treasury. It maintained a rather precarious existence, having neither a large number of professors nor students, and doing but very little high class scientific work until the outbreak of the cattle plague, when the necessity for veterinarians and veterinary learning became prominent. Agriculture was threatened with disaster and ruin, ineffectual attempts were made by agriculturists and physicians to ward off the impending calamity, but the only practical result was to bring them to a realization of their own inefficiency and lack of

knowledge. Veterinarians were appointed; the extension of the cattle plague was prevented, and within a few years the disease was thoroughly stamped out. This recognition of the veterinarian by the civil authorities placed veterinary science in England on a new basis, so that it was really not until the outbreak of the cattle plague that England took rank, in veterinary matters, with the other countries of Europe. Isolated cases of the same sort of bitter experience have taken place, from time to time, in other parts of the world. Many are the instances in which the work of veterinarians has been usurped by others, always, however, with unsatisfactory and disastrous results, and in every case veterinarians have eventually been called upon to do veterinary work.

The veterinary profession in the United States has always been on an independent basis. It is not the policy of our free government to assist the professions. Large appropriations of lands and money have been made to further the cause of general education, and of education in agriculture, mechanical arts, engineering, architecture and kindred subjects, but professions have been excluded from all benefit of these funds. Most of the veterinary schools in this country are private institutions owned and directed by single men or by a few teachers. A few are departments of universities, and are subject to the trustees and faculties of these institution of learning. The veterinarian has never been recognized in the organization of the United States army and, although some are employed, they are engaged as civilians without military rank, and are paid a salary that does not guarantee the services of the best men. Civil positions for veterinarians are not numerous. The matter of the control of contagious diseases is, in some States, delegated to committees, commissions or boards, made up of farmers. These bodies usually employ a veterinarian to make inspections for them, but he is frequently without executive authority and is unable to act without previously having obtained the consent or approval of the laymen by whom he is employed.

The Bureau of Animal Industry is an exception to the general rule. This bureau has at its head a skilled and thoroughly scientific, as well as practical, veterinarian; as assistants in the execution of his field work he has numerous well qualified men. It is due to the efforts of this bureau and its agents (chief of whom was Dr. James Law) that pleuro-pneumonia was

exterminated in such a short time, a time so short that it seems incredible to European veterinarians. But this bureau can not do, nor does it attempt to do, the work that comes within the jurisdiction of the individual State. It is of the greatest importance that every State should have a qualified and thoroughly competent veterinarian at the head of its veterinary department.

In olden times, before the veterinary profession had reached its present high standard, there might have been some excuse for appointing laymen to carry out the functions of a State veterinarian, but now that we have skilled, competent and judicious veterinarians, the conditions that lead to these anomalous appointments have disappeared and the appointments should be changed. At present it is as rational to appoint a farmer to look after the health of the live stock of a State as it would be to appoint a shoemaker as State surveyor or a druggist as attorney general. States need, and should demand, the best skill attainable. The health of the live stock will not be looked after as it should be until each State has its veterinary department presided over by a first-class veterinarian.

As was mentioned above, it was through the prevalence of contagious diseases of cattle that the veterinary profession reached its high standard in European countries. In controlling and exterminating these diseases, veterinarians were enabled to exhibit their ability and bring the public to a realization of the importance of the profession. America has, fortunately, been free from all these troubles except pleuro-pneumonia, which is now extinct, and veterinarians have, therefore, not been needed in public places so urgently as they would have been under other circumstances, but we have with us a disease far more insidious, fully as wide spread and vastly more important than any of the prevalent cattle diseases of the olden times. Tuberculosis is to be found among the cattle of every State. While it is by no means so prevalent here as it is in Germany and France, it is, nevertheless, prevalent enough to demand the grave attention of stock breeders, veterinarians, sanitarians and legislators. It is a disease that is contagious, that is dangerous, not only to cattle but to men, and not only directly but indirectly through the milk and flesh. This is a phase of animal disease that was absent in pleuro-pneumonia, against which it was necessary to wage such an expensive war. Tuberculosis is becoming

more prevalent; it can probably be exterminated, but only by the use of measures to be advised and enforced by veterinarians. Let the veterinarians realize that they have here the opportunity of a generation, of a century, to show the public their value as conservers of the live-stock interests, as protectors of the public health and as public spirited men, able to do all classes a great and enduring good.

That veterinarians should have charge of work of this sort is shown by the experience just ended in New York State; there the control of tuberculosis among cattle was placed in the hands of the State Board of Health, made up of men who were thoroughly competent to deal with diseases of the human species, but were totally at sea when they were called upon to look after diseased animals. They appreciated the relation of their work to the public health, but did not appreciate their duties to the cattle and dairy interests.

It is safe to say that the $20,000 so quickly and recklessly spent in New York State did more damage than five, yes, twenty times that sum would repay. This is an illustration of the fact that while physicians are doubtless able to prevent the spread of many infectious diseases of the human family, they are helpless when it comes to tuberculosis of cattle. That agriculturists can not properly handle this subject, as they are inclined to try to do in many places, is very evident, and all work of this class should devolve on veterinarians, who alone are trained to an appreciation of its importance and the methods to be adopted in protecting the farmers, the cattle interests and the public.

ABSTRACTS.

IMPORTATION OF FOREIGN CATTLE.

Mr. H. Gardner, President of the Board of Agriculture, in company with Mr. T. H. Elliott, Mr. Cope, Mr. A. W. Anstruther, and Mr. Benson, M. P., received yesterday, at the offices of the Department, a very large and representative deputation asking for a compulsory slaughter, except under very special conditions, of all live cattle at the port of landing. The deputation was introduced by Mr. Channing, M. P. President of the Central and Associated Chambers of Agriculture.

Mr. Channing explained that the opinions of the large majority, not only of the agricultural bodies associated with the Central Chamber, but of the practical agriculturists in the country, were absolutely at one in the desire that the great victory which science and good administration had won over the diseases which in former years had decimated our flocks and herds and inflicted such disastrous losses on agriculture should be made complete, stable and permanent.

Mr. St. John Ackers, Chairman of the Cattle Diseases Committee of the Central Chamber of Agriculture, pointed out that the only country from which live cattle were imported was Canada, and they represented less than three per cent of the meat supply of this country.

Mr. Freeman-Mitford, Earl Fortescue, Mr. Mills, Mr. Duckham, and Mr. Christopher Middleton having given expression to their views, Mr. Gardner, in reply, drew attention to the necessity of defining the particular diseases against which it was asked that further and fuller safeguards should be imposed. ["Oh, oh."] The proposal which he asked to carry out was nothing more nor less than universal and perpetual slaughter of foreign and colonial cattle at the port of debarkation. [Hear, hear.] That would be a very inefficient protection against the two most dangerous, destructive and costly diseases which stock-owners had to fear—namely, rinderpest and foot-and-mouth disease. At the present moment, if the Board of Agriculture saw any danger of the introduction of

those diseases, they did not order slaughter at the ports of debarkation, but in the case of rinderpest they undoubtedly should prohibit, and in the case of foot-and-mouth disease they were bound by statute to prohibit the landing of all foreign cattle whatsoever in this country. He took it for granted that the only disease against which they had come to urge him to take further safeguards was contagious pleuro-pneumonia, for there was no other disease against which slaughter at the ports afforded a full measure of security. If the members of the deputation wished to carry their point in this direction, they must satisfy Parliament and the people of the country, first of all, that the step was necessary, and, secondly, that it is worth while to lay down an absolute and universal rule of slaughter at the ports merely in order to prevent a recrudescence of one disease, and one disease only. With regard to the necessity for the drastic measure which had been urged, the experience which the department had gained in the course of their successful struggle with pleuro-pneumonia went to show that the present law afforded ample protection against its importation through the medium of foreign stock. With the exception of one animal, which was slaughtered immediately after it became affected, in no single instance was there reason to believe that any home-bred animals had been affected with pleuro-pneumonia in consequence of contact with animals imported from another country, and that notwithstanding the fact that during the past ten years over 1,500,000 animals had been allowed to be landed without restriction. The administration of the Contagious Diseases (animals) Acts was one of the most anxious and responsible duties cast upon the President of the Board of Agriculture. He could not commend such a proposal to the House of Commons with any chance of success. At the present moment the Department was in a better condition than ever before to prevent the serious consequences which would accrue to the country from the importation of pleuro-pneumonia. The risk of infection by means of foreign animals was very small, and the chance of disease spreading amongst our cattle was almost infinitesimal. Compulsory slaughter in all cases would undoubtedly act detrimentally upon our commercial relations with those countries and colonies which were now free from disease or which had reasonable hope of becoming so in the near future. They would protest very strongly against the

imposition of these restrictions when they knew that there was no cause to fear the introduction of disease into this country.

In his view it would also be most unwise and detrimental to the best interests of this country to throw obstacles in the way of free imports, and to handicap our foreign and colonial trade unless they were in the presence of a real and proved necessity. Why should graziers who saw their way to make a good profit by the importation of live stock be precluded from doing so? He had come to the conclusion that from the farmers' point of view alone the loss attending compulsory slaughter would far exceed the advantages gained; for, whilst affording a very slight additional security, it would involve the payment of a greatly enhanced premium against the introduction of disease. The law as it stood, properly administered, afforded a sufficient remedy at no considerable expense to the taxpayer and with the minimum of loss to the agricultural community generally. He could not hold out any hopes that he would be in a position to advise Parliament to accept the proposals which the deputation had urged upon him.—*The Veterinary Record*, April 7, 1894.

DEATH IN THE FAMILY COWS.

The four-year-old grandson of Colonel Henry B. Beecher, of North Broadway, Yonkers, died Tuesday at 4 p. m. of tubercular meningitis. His physician says that the disease undoubtedly originated in two fine Alderney cows which Colonel Beecher bought last May.

The case is of special interest, because it seems to prove that tubercular meningitis can attack an apparently perfectly healthy child which has no hereditary scrofulous or tubercular tendencies. Some authorities have held that an hereditary tendency always prepared the way for the disease. The case was also unusual from the absence of one or two symptoms which have been regarded as almost certain to accompany its earlier stages, viz., headaches and inability to retain food on the stomach. The complete isolation of the child from outside associations and influences in a healthful country house frees the case of all elements of doubt. Indeed, it was the certainty

that the little sufferer had tubercular meningitis, and the inability to account for it, that caused suspicion to be directed toward the cattle.

Barton was the only son of William A. Harper, of the firm of Harper & Brothers, a family that is free from tendencies toward consumption. His mother was the oldest daughter of Colonel Beecher, who says that his family is also absolutely free from such tendencies. The only juvenile associates of the boy who died were the children of Messrs. White and McKay. These children were invited to Barton's birthday party a month ago, and it was noticed then how hard he tried to entertain his little friends, notwithstanding an evident languor and listlessness.

These symptoms grew more pronounced, and the family physician, William H. Sherman, of 271 Warburton avenue, was called in on March 10. The boy was losing control of his limbs, his temperature was high and his pulse weak; he strained back his neck, lay with his eyes half opened or rolled back the eyeballs. All these symptoms indicated to the physician that the boy had meningitis, but the differentiation of the tubercular from the simple, or cerebral meningitis was more difficult. The slow development of the disease, particularly at the outset; the fact that the temperature rarely went above 101, and that the malady did not progress with rapidity, convinced him that it must be tubercular meningitis; but, to make sure, he called in Dr. Moses A. Starr, professor of diseases of the mind and nervous system in the College of Physicians and Surgeons of this city, who confirmed the diagnosis and commended the treatment. As it is doubtful whether any patient who really has had tubercular meningitis has recovered, the usual treatment is to administer bromides, iodide of potash, quinine and opium, with a view to stimulate the vital organs as much as possible, and at the same time deaden the senses to pain.

He gradually lost all power of motion. For a long time he could answer questions by nodding and shaking his head, or pointing with his fingers; but later he was bereft of the power of making even these motions, and he sank into a coma, which grew more and more deep until his death.

The great question in Dr. Sherman's mind was, Where did the boy get the disease? As soon as he had concluded that the trouble was tubercular he called in Dr. Joseph C. Jackson,

a veterinary surgeon, of 27 Woodworth avenue, who made an examination of the suspected cattle, and pronounced them sound and healthy in every particular. It is said that a second veterinarian also examined the cows with a like result. He ascertained that the child had had no baker's bread or cake to eat, had had no fruit nor candies from the city, and had associated with no one from the outer world. The doctor was drawn to the conclusion that the cows were the cause of the trouble, and that the tuberculosis had not yet made enough progress upon their bodies to be seen by the trained eyes of the veterinarians. He, therefore, advised Colonel Beecher to try the Koch test on the cows. Dr. J. S. Lamkin, of 53 Warburton avenue, was called on to perform the test. There is only one drug house in this country, according to Dr. Lamkin, where the Koch lymph can be purchased, and that is Schulze-Berge & Koechl, of 79 Murray street, this city, one of the partners of which is a son-in-law of Dr. Koch. Through him some of the preparation was secured, and on Friday night Dr. Lamkin repaired to the Beecher place to perform the test.

Three cows have supplied the little community in Bonnybrook Park with milk. No. 1 is a red cow, belonging to Mr. White; No. 2 a black cow and No. 3 a cream colored cow, both belonging to Colonel Beecher. Naturally, the McKay and White families were much interested in the result of the test, as their children had been drinking the same milk.

The three cows are all kept in the same barn. At 8.30 p. m. Dr. Lamkin began the operation. He took the temperatures of the cows and found them all normal in that respect. Then he carefully clipped away from a spot on the right shoulder of each cow all the hair and washed the spot thoroughly with a disinfectant.

After suitably carbolizing a quantity of distilled water, he prepared a solution of the water and the lymph, of which the lymph constituted ten per cent. With this solution he filled a hypodermic syringe, and at 11 p. m. he injected something like thirty drops of the solution into the shoulder of each cow. He then went home to give the lymph time to accomplish its work.

The universal experience thus far has been that whenever a man or animal has been free from tuberculosis the temperature remains practically the same after an injection of the lymph.

If, however, the man or animal has tuberculosis it is indicated by a pronounced rise in temperature within ten or twelve hours. The next morning, which was Saturday, the doctor was on hand to take the temperatures of the animals, and he took them every three hours that day from 6 a. m. to 9 p. m. The following table shows the results:

	No. 1. Mr. White's Red Cow.	No. 2. Col. Beecher's Black Cow.	No. 3. Col. Beecher's Cream-colored Cow.
At 8.30 p. m.	101 1-5	101 2-5	100 3-5
At 6 a. m	101 1-5	101 2-5	100 1-5
At 9 a. m	101 1-5	104	102 1-5
At 12 m.	101 1-5	106	105 4-5
At 3 p. m	101 1-5	104	104 2-5
At 6 p. m	101 2-5	104 1-5	104 1-5
At 9 p. m	99	104 3-5	103 2-5

During Sunday Dr. Lamkin did not examine the cows, but on Monday morning he found their temperatures were all normal again. Dr. Lamkin concluded that Mr. White's cow was all right, but that both of Colonel Beecher's cows unmistakably had tuberculosis. Dr. Sherman, too, under whose supervision the test was made, says that there is no doubt that Colonel Beecher's cows have that disease. Further tests in the case of Mr. White's cow will be made during this week.—*New York Sun, March 29.*

NEW LITERATURE.

A. Railliet, Traité de Zoologie Médicale et Agricole. (Asselin & Houzeau, Paris, 1893.) Premier fascicule, 736 pp., 496 figs.

The first part of Railliet's excellent work on medical zoology has just reached this country and as it is a most important publication it is deserving of more than a passing notice.

Part I, consisting of 111 pages, is taken up with a discussion of general zoology, the author reviewing the differences between the organic and the inorganic, and between animals and plants; from this he passes to the cell, then describes the various tissues and compares the different systems of organs in the animals of the various sub-kingdoms. The remaining portion of Part I treats briefly of embryology, the relations of animals to their environment, of animals to man, evolution, parasitism and the general principles of taxonomy.

In Part II the animals are treated systematically and biologically, the author paying particular attention to those animals which are useful to mankind.

The portions which will be of particular value to the veterinarian are those describing the different parasites found in Man and the domesticated animals. As Railliet is one of the foremost parasitologists of the world, we naturally expect to find this portion of his work of particular value, and to say the least we are not disappointed. The name of the parasite with its synonyms and the dates of the same, is followed by a brief but concise description of the animal, this in turn by its life-history, and geographical distribution, and in many cases the symptoms and pathology produced by it. The nomenclature of the species is up to date, a character which must be looked upon as rather an exception in a general textbook, and this is the only textbook of zoology known to me personally in which the various genera of parasitic worms are properly described. Take for instance the genus *Tænia*. Although

helminthologists have for years recognized several distinct genera in the old Linnean genus *Tænia*, very nearly all of the more recent textbooks in zoology unite these various forms in one genus. In Railliet's work the old genus *Tænia* appears as (1) *Tænia* (type *T. serrata*), with three sub genera *Cysticercus*, *Cœnurus* and *Echinococcus*, (2) *Moniezia* R. Bl. 1891 (type *M. expansa*), (3) *Thysanosoma* Dies., 1834 (type *Th. actinioides*). *Stilesia* gen. nov. (type St. *globipunctata*), *Ctenotœnia* gen. nov. (type *Ct. marmotæ*), *Anoplocephala* E. Bl., 1848 (type *A. plicata*), *Andrya* gen. nov. (type *A pectinata*), *Dipylidium* R. Lkt., 1863 (*D caninum*), *Hymenolopis* Weinland, 1858 (type *H. murina*), *Drepanidotœnia* Raill., 1892 (type *Dr. gracilis*), *Dicranotœnia* Raill, 1892 (type *Di. coronula*), *Echinocotyle* R. Bl., 1891 (type *E. Rosseteri*), *Davainea* R. Bl. et Raill., 1891 (type *D. proglottina*), and *Mesocestoides* Vaillant, 1863 (type *M lineatus*). Generic diagnoses of these forms are given, but it is to be regretted that the author did not insert an analytical key also.

One point in connection with the work will possibly meet with adverse criticism from some quarters, especially from the veterinarians, and that is the boldness with which Railliet enforces the law of priority. *Ascaris megalocephala* Cloquet, 1829 has been suppressed in favor of *A. equorum* Goeze, 1782; *Sclerostoma equinum*, supplants *Strongylus armatus*; *Pentastoma* Rud., 1819 falls into synonymy in favor of *Linguatula* Frölich, 1789 and *Porocephalus* v. Humb., 1811., etc., etc. The person who is disposed to criticise this change of names must, however, recall that the subject of animal parasitism in veterinary medicine is simply a part of zoology, and that the persons writing in this field must follow certain inflexible laws passed by the International Zoological Congresses, and one of these laws is the "Law of Priority." From a practical standpoint, one matter occurs to me which would greatly enhance the usefulness of this work, and it is to be hoped that Professor Railliet will take the subject under advisement in preparing the final pages (index, etc.) of the volume. It will be remembered that Neumann has arranged these parasites according to the organs of the various animals in which they occur, an arrangement which has certain advantages and also certain disadvantages. Railliet on the other hand has rendered the subject much more compact by following the zoological order.

If he would now place at the end of the work a compendium of the parasites of Man and the domesticated animals, he would combine the advantages of both methods and greatly aid veterinarians in determining the species they find.

Taken all in all, Railliet's Traité must be looked upon as the finest work upon medical and agricultural zoology printed in any language, and a volume which should be found in the library of every veterinarian. STILES.

PROCEEDINGS OF SOCIETIES.

MASSACHUSETTS VETERINARY ASSOCIATION.

The regular monthly meeting of the Massachusetts Veterinary Association was held at 19 Boylston Place, on January 24, 1894, at 7.30 p. m.

The president, Dr. Burr, occupied the chair. The members present were Drs. Becket, Blackwood, Burr, Emerson, Towle, Howard, Marshal, Parker, Simpson, Winchester and Winslow. Honorary member, Dr. Stickney.

The minutes of last meeting were then read and accepted, and there being no business before the Association, and the regular essayist not having arrived, Dr. Parker read a paper on "The Prevention of Tuberculosis."

In the discussion which followed, Dr. Winchester suggested that the Association take steps to have tuberculosis placed on the list of contagious diseases. It is generally accepted that there is no other disease which causes so many deaths as tuberculosis in its various forms. As showing the value of sanitary reform, he referred to the towns in the Merrimac Valley. These towns use the river water for public services. Through the exertions of one of the members of the State Board of Health, a filtering gallery for river water was put in at the city of Lawrence; since then the death rate has been much reduced. The death rate from typhoid is now under four per cent, while the death rate from tuberculosis is nearly eight per cent. Continuing, he said this Association ought to be the first to put itself on record as recognizing tuberculosis as a contagious disease.

Dr. Emerson thinks the idea of conferring with the State Board of Health is a good one.

Dr. Becket said he had been somewhat surprised lately to see in insurance reports an article congratulating the companies and the public on the fact that, according to insurance reports, people are getting longer lived, and that deaths from tuberculosis are gradually decreasing.

Dr. Parker stated that the reason given for the seeming falling off in deaths from tuberculosis was because the establishment of post-graduate schools, and the consequent better education of country practitioners, had resulted in greater strictness in examination; fewer poor risks had been taken by the insurance companies with the result that in the Insurance Commission reports the death rate from tuberculosis has decreased.

After a further discussion, Dr. Winchester moved that a committee be appointed from members of the Association to approach the authorities on the subject.

Dr. Burr wished to point out that in the city of Boston the By-Laws required that each animal shall have 1000 cubic feet of air. Many of the other points suggested by the essayist were at present in force in the city. He thought the Cattle Commissioners were doing all in their power with the force at their disposal. The amount of work they had to do was very great.

Dr. Howard thinks if anything is to be done in the matter, it should be well discussed, statistics should be looked up, and the Association should be sure of its ground. He then moved that the discussion should be continued at next meeting. Seconded by Dr. Winslow.

Dr. Parker moved as amendment that a committee be appointed, consisting of members of the Association who have had experience with tuberculosis, to report at next meeting on the subject of tuberculosis. Seconded by Dr. Blackwood and carried unanimously.

Dr. Winslow then moved that the committee consist of five persons, with the president and secretary *ex officio*. Carried.

Dr. Howard moved that the committee be appointed from the floor. Carried. The following committee were then appointed, with instructions to report at next meeting. Dr. James B. Paige, Amherst; Dr. Winchester, Lawrence; Drs. Peters, Howard and Osgood, Boston, with the president and secretary *ex officio*.

Dr. Simpson then read an interesting paper on "Digitalis."

In the discussion which followed, Dr. Howard said he usually tried to limit the amount to one drachm of the fluid extract in the twenty-four hours. The great danger in its use is from the digestive troubles that supervene. It should be used with caution. When judiciously used, however, it is a valuable remedy.

Dr. Becket has had good results where the horse has recovered from the acute stage of pneumonia, leaving him with feeble pulse. It should, however, be used with great caution.

Dr. Winchester has had good results from veratrum viride in cases where the pulse was eighty or ninety, and small and weak. He has used veratrum and in a few hours the pulse has come down and is strong and full; afterward gives alcohol. The after results of "digitalis" are sometimes serious, but he has never seen any bad results from veratrum.

After a good deal of discussion, and a vote of thanks to the essayist, the president called for report of cases.

Dr. Parker reported an unusual case of azoturia. The horse belonged to the Haverhill Street Railroad Company, and had not had a day off for three years. He was taken sick at the end of a day's work, when he was on his last trip. About five miles from his stable he was noticed to stumble once or twice; finally he came down unable to use his fore legs. The day was very stormy, sleet was falling and a nasty wind was blowing. The horse unfortunately had to lie on the wet snow in the storm for about two hours, covered only by a couple of old sacks; finally he was put on a stone drag and hauled to a barn one-half mile away.

He was suffering a good deal, the muscles of the shoulders were rigid, he was unable to use his fore legs, and his urine was dark and coffee colored. The next morning, with the help of slings, he was placed on his feet, put on a sled and taken home, where he died the following night.

Dr. Howard reported a somewhat similar case where the horse had been working every day, and had not been loafing. When seen he was unable to stand, and the urine had the characteristic dark color. He recollected three cases with paralysis forward, muscles of the shoulder hard and dark colored urine.

Dr. Blackwood has had several cases where the fore extremities have been affected. In these cases it is common to have atrophy of the muscles.

Dr. Marshal reported a case where the horse recovered from the first attack and for some time afterward had weekly attacks.

Some of the other members had cases similar to those reported.

The discussion then turned on kicking mares, and the effect produced by spaying and excision of the clitoris. Dr. Becket reported three cases in which he had excised the clitoris by making an incision round the base and sloughing off by common elastic band. He had good results in two of the cases mentioned.

The meeting then adjourned till next month.

JOHN M. PARKER,
Secretary.

The regular monthly meeting of the Massachusetts Veterinary Association was held at 19 Boylston Place, on Wednesday, February 28, 1894, at 7.50 p. m. The members who were present were Drs. Becket, Bryden, Burr, Emerson, Howard, Labaw, Marshall, Osgood, Parker, Peterson, Soule, Winchester and Winslow. Honorary member Dr. Stickney.

The minutes of the last meeting having been read and accepted, the report of the Committee on Tuberculosis was submitted.

The recommendation of the committee embraced the following points:—

1. That the March meeting be devoted to the consideration of the subject of tuberculosis.

2. If the previous recommendation be adopted by the Association, that the members of the Association invite any person interested in the subject of tuberculosis to be present.

3. That the Association employ a stenographer for the evening of the March meeting.

4. That the Association pass a resolution putting themselves on record as recommending that, as bovine tuberculosis has been placed under the "Contagious Diseases of Animals" Act, we believe that certain forms of the disease in man should be recognized.

The *first recommendation*, that the March meeting be devoted to the discussion on the subject of "tuberculosis," received a good deal of discussion. It was finally decided that the time before the March meeting was too short for the preparation of papers on such a subject, and it was thought best to delay the discussion till the month of May.

The *second recommendation*, that the members invite any person interested in tuberculosis to be present, was unanimously adopted.

The consideration of the third recommendation was posponed till later.

The *fourth recommendation* created a lively discussion, Drs. Bryden, Howard, Osgood, Winchester and others taking part. Dr. Bryden objected to the passage of such a resolution on the ground that tuberculosis is neither so widespread nor so serious as has been represented. Finally Dr. Howard offered the following resolution, which was seconded by Dr. Winchester.

Resolved, that as bovine tuberculosis is recognized by the "Contagious Diseases of Animals" Act as a contagious disease, in our opinion, that, being due to the same germ, certain forms of the disease in *man* should *also* be recognized by law as contagious.

After some further discussion the resolution was adopted with one dissenting vote.

Drs. Osgood, Burr and Parker were then appointed a committee to interview some of the well known physicians and pathologists, with the object of getting them to read short papers on tuberculosis at the May meeting.

There being no further business, the meeting adjourned till further notice.

JOHN M. PARKER,
Secretary.

VETERINARY MEDICAL ASSOCIATION OF WEST IOWA.

The eleventh quarterly meeting of the Western Iowa Veterinary Medical Association was held in the office of the president, Dr. G. A. Johnson, Sioux City, Ia., on Tuesday evening, April 10, 1894.

Although the attendance was small, interest was not lacking among the members present.

Among other matters considered under the head of routine business, the Committee on Legislation reported the failure of the State Association Committee on Legislation to secure the passage of the Sawyer Bill. It was the opinion of the committee that two factors entered into the defeat of the bills. The first was the failure of the State Association Committee to have a meeting at Des Moines, while Legislature was in session, and the second was the indifference of many of the members of the profession throughout the State.

The committee urged a better attendance at the meeting of the Veterinary Associations, and a more united effort in the future.

The discussion following this report was quite lengthy and animated.

It was decided that the assessment of one dollar per member of this Association, declared at the last meeting (January 31, 1894) to defray the expense of the Legislature Committee, and not used, should be turned into the treasury for future use of the Association and that all members who had not paid same be notified to do so at once.

Dr. F. P. Gaunt, of Akron, Ia., reported two cases of cystic obstruction.

In the first case the doctor operated as follows: Injected cocaine at the ischial arch of the urethra, passed a catheter, cut down on the same, and by means of a placenta (human) forceps succeeded in drawing away about one pint of sebaceous matter, which very closely resembled that found in the sheath of a healthy horse.

After removing all the solid matter he washed out the bladder with creolin solution and closed wound with two interrupted sutures. Case made a very satisfactory recovery.

Question. What was the cause of an accumulation of this character?

A second case presenting similar symptoms proved on examination to be suffering from enlargement of the prostate glands.

Case made good recovery under pot. iodide treatment.

Dr. J. I. Gibson, of Denison, Ia., reported a case of uterine torsion in a cow, which he reduced by opening the cow and with his hand introduced into the

uterus as far as possible he held it from turning while assistants rolled the cow same direction as the torsion, by this means the torsion was reduced and the cow delivered of a live calf. The object in rolling the animal in same direction as the torsion was to have her catch up with uterus so to speak.

Dr. G. A. Johnson reported a case of puncture at the perineum of a mare in foal, that extended along the side of and partially under the vagina and bladder into the abdominal cavity, as was demonstrated by the passage of the hand. Under antiseptic treatment the case made a satisfactory recovery.

This case demonstrated that very severe wounds of the abdominal walls may be successfully treated antiseptically.

All the above cases provoked spirited discussions, all members present taking part.

It was decided to hold the next meeting of the association in this city some time during the early part of July. Adjourned to meet at the call of the president.

J. I. GIBSON,
Secretary pro tem.

THE TENTH ANNUAL MEETING OF THE VETERINARY MEDICAL ASSOCIATION OF NEW JERSEY,

was held at the State Street House, April 12, 1894. Meeting called to order at 11.30 a. m., by the president, the following members answered to the roll call: W. B. E. Miller, J. W. Hawk, J. C. Dustan, A. Brown, J. C. Higgins, B. F. King, W. Runge, R. O. Hasbrouck, S. Lockwood, J. Gerth, Jr., J. M. Everitt, M. M. Stage, E. Britton, B. L. Drummond and I. Kilburn, the delegates from Pennsylvania State Veterinary Medical Association, Dr. Horace Hoskins, Professor Leonard Pearson; New Jersey Medical Association, Dr. J. W. Stickler, M. D., and A. Van Nest Baldwin, M. D.

Visitors: Dr. Harker, of Trenton, and Mr. George Fetter.

Minutes of previous meeting read and approved. The president's address was of a practical nature and was the keynote to our future success as veterinarians. The secretary then reported the death of one of our members, Dr. O. C. Eisenhart, of Asbury, Warren County, N. J., on February 1, 1894. The president appointed Doctors Dustan, Brown and King a committee to draft suitable resolutions, and forward a copy of same to relatives of deceased, also to drape a chair for this meeting. The secretary reported only twenty-five active members. The treasurer reported a balance in hand of $38.74. Dr. Drummond then read a report of some cases of lead poisoning in cows. Dinner being ready, adjourned at one o'clock.

2.15 p. m., meeting reconvened. Dr. Higgins moved to suspend the order of business and listen to the reading of the legislative bill. Carried. Dr. Baldwin then read the bill, which was approved by the association. Dr. Baldwin then read assembly bill 363, relating to tuberculosis, and now before the Assembly. Dr. Hawk moved that the meeting disapprove this bill, and that the president and secretary notify the State Board of Agriculture of the

same. Carried. Dr. Hoskins then spoke of the proposed bill and congratulated, not only the association, but the people of the State in having men who were trying to benefit the masses of the people by trying to eradicate this dread disease, "tuberculosis," from the State. He was followed by Dr. Stickler and Dr. Miller. A vote of thanks was then tendered the joint committees and Drs. Stickler and Baldwin especially for their efforts in getting the bill ready for this meeting.

Election of officers resulted as follows:

President, Dr. W. B. E. Miller, Camden, N. J.; first vice-president, Dr. J. C, Higgins, Bound Brook, N. J.; second vice-president, Dr. E. Britton, Long Branch, N. J.; secretary, Dr. S. Lockwood, Woodbridge, N. J.; treasurer, Dr. B. F. King, Little Silver, N. J. Trustees, Dr. J. W. Hawk, Dr. J. C. Dustan, Dr. R. O. Hasbrouck, Dr. W. Runge and Dr. A. Brown.

Dr. J. W. Stickler, M. D., and Dr. A. Van Nest Baldwin, M. D., were elected honorary members of the Association.

Dr. Hawk then spoke on cold storage, a system which he condemned as at present conducted.

Dr. Runge spoke on same subject. The methods by which fish and meats are kept so long a time was something new to most of the members. The president appointed Drs. Hawk, Runge and Dustan a committee to investigate the subject and report at next meeting.

Dr. Dustan then read a paper on the advancement of veterinary science. The president appointed for essayists, Dr. E. Britton, Dr. J. C. Higgins, Dr. J. Gerth, Jr., and Dr. W. Runge, and delegates to the Pennsylvania State Veterinary Association; delegates to New York State Veterinary Association; delegates to the New York County Veterinary Association.

The bill pertaining to the eradication of tuberculosis was introduced in the Assembly at four o'clock. The meeting adjourned at 4.30 to meet on the second Thursday in August, 1894, in Newark, N. J.

S. Lockwood,
Secretary.

VETERINARY COMMENCEMENT.

GRADUATING EXERCISES OF VETERINARY DEPARTMENT OF McGILL UNIVERSITY.

Program of Convocation for the Conferring of Degrees in Comparative Medicine and Veterinary Science, Friday, March 30, 1894, at 3 p. m.

Prayer, faculty lists—dean, award of prizes and honors to students, conferring of degree of D. V. S., valedictory by Dr. Cecil French, address by Professor G. P. Girdwood, M. D., address by J. W. Gadsden, M. R. C. V. S., address by Sir William Dawson, LL. D., Benediction.

REPORT—SESSION, 1893-'94.

The Session opened on the first of October, and was continued till March 30.

The number of students registered was fifty-three. Of these forty-eight attended the full course, viz.: from United States, seventeen; Canada, thirty-three; England, two; Hawaiian Islands, one.

United States.—Massachusetts, six; New York, three; Missouri, two; Pennsylvania, two; Minnesota, two; Maine, one; New Jersey, one. Total, seventeen.

Canada.—Quebec, twenty-six; Ontario, four; Nova Scotia, one; Northwestern Territories, one; Manitoba, one. Total, thirty-three.

England.—Middlesex, one; Wales, one. Total, two.

Hawaiian Islands.—Honolulu, one. Total, one.

Prizes.—Veterinary medicine and surgery, Cecil French; anatomy, J. C. Hargrave; cattle pathology, Cecil French; cynology, A. E. Moore; zoölogy, H. Dell; chemistry, J. C. Hargrave; physiology, J. C. Hargrave; for the best general examination in all subjects, Cecil French.

Scholarships.—For the highest aggregate obtained in first year subjects (fifty dollars), Harri Dell; for the highest aggregate obtained in second year subjects (fifty dollars), J. C. Hargrave.

Extra prizes.—For the best essay read before the Veterinary Medical Association: First, Cecil French; second, A. E. Moore; third, C. J. Mulvey; for the best essay read before the Society for the Study of Comparative Psychology: First, A. E. Moore; second, J. A. Buchan; third, J. H. McLeod. Next in order of merit is J. V. Solandt.

Candidates for the degree of D. V. S.—B. Anderson, G. P. Baker, J. A. Buchan, A. G. Cannon, E. J. Cary, H. R. Cleveland, C. French, R. H. Grattan, A. H. Hall, D. McAlpine, J. D. McGillivray, J. H. McLeod, A. E. Moore, C. J. Mulvey, I. L. Salley, J. R. Shaw, J. V. Solandt, R. Thomas, J. F. Walsh.

MONTREAL.

The Dean, Duncan McEachran, F. R. C. H., after reading over the faculty lists, said:

In presenting the report of the work done by this faculty during the session just closed, it is not necessary, nor is it my intention to detain you with any lengthened remarks.

I have pleasure in reporting that the duties of the session have been carried out by professors and students in a satisfactory manner, and I am confident that the young gentlemen who come up for their degrees to-day will do us credit. They at least compare favorably with the graduates of any other English speaking veterinary school.

I had much gratification when attending a congress of the veterinary profession at Chicago in October last, to find that not only were the president and vice-president graduates of the college, but McGill influence seemed to dominate the meeting, and I was pleased to meet so many of our men there who are making their mark as scientific veterinarians in the United States.

Much progress has been made in veterinary science during the past year, excellent work has been done in determining the reliability of tuberculin as a test for bovine tuberculosis, thereby affording sanitarians a means whereby the ravages of this insidious malady in dairy herds can be effectively dealt with, and the danger to public health be thus averted.

The use of mallein also as a test for glanders has been further confirmed, and this incurable contagious disease of horses can now be properly dealt with in the light of science.

The excellent work done in the pathological laboratory by Professor Adami in his masterly report on the portion of lung sent from England, as contagious p. pneumonia discovered in a Canadian animal, may be considered of natural importance, I wish here to congratulate you, sir, Mr. Chancellor, on the happy results which not only this university but the Dominion of Canada enjoy from your princely liberality in endowing this chair.

Much has been done, sir, by all the teaching staff to inculcate a true appreciation of the importance of acquiring a thoroughly scientific knowledge of medical science in the comparative branches. We have endeavored to encourage a love for animals, to instill in the minds of the students a detestation of cruelty, and Professor Mills especially has done good work in teaching them to study and carefully investigate the psychological development of the domestic animals, and thus we hope to accomplish our chief object, namely, to improve the condition in health of sensitive, though speechless companions which serve so useful a purpose and add so much to our comfort and pleasure, and also to educate our young men to deal with the major questions of preventing and dealing intelligently with diseases which affect those animals which we use as food, and which are prone to communicate to the human family diseases with which they are affected.

It is a noble science, and one worthy of the most reflective mind or comprehensive genius; and gentlemen graduates I want you to know and feel, that whether we have reached that stage in the history of our profession when its value and importance in the progress of a nation is understood or appreciated or not, you certainly lose no dignity in your choice of a profession—on the contrary, you have

selected one which offers a wider scope, a broader sphere for scientific work, and one only second to the noble healing art in man himself.

Therefore, go forth to your work, knowing that in your sphere of labor there are many avenues by which you can attain eminence. You have the best wishes of your teachers and your alma mater, and never forget that a profession cannot make the man, but the man can do much to elevate or lower the status of his profession.

I take this opportunity of thanking those gentlemen who have at considerable inconvenience to themselves come long distances to assist us in forming the examining board, and you ladies and gentlemen, for your assistance here to-day, in forming the examining board.

The valedictory was delivered by Dr. Cecil French, who suggested a higher standard for matriculation, and spoke a kind word for each of the professors.

Dr. Girdwood, on behalf of the professorial staff, spoke words of congratulation to the members of the graduating class and wished them God-speed. He took a brief retrospect of the history of the Veterinary College, and showed the progress it had made since it was started by Dr. D. McEachran twenty-eight years ago. The position which it had attained, however, could only be maintained by constant and continued work on the part of all. One of the matters which the teaching staff desired to see was the raising of the standard of preliminary education, by which the minds of the students would come to the college better prepared to imbibe the instruction given them. In conclusion, he assured the graduates that whenever they wanted a friend or advice the members of the teaching staff would always be ready to give them assistance.

The next speaker was Sir William Dawson, who said that it gave him pleasure to say a few words in reference to the faculty of veterinary science, not from an official standpoint, but merely as a citizen and well-wisher of his country. He had taken an interest in the Veterinary College from the first, not merely because he saw that Dr. McEachran and his colleagues were the right men in the right place, and because he sympathised with their arduous efforts in a worthy cause, but because of the object itself.

The wealth and even the subsistence of the people of this country depends so much on our live stock that every thing that tends to bring the appliances of modern science to bear on its improvement and its exemption from epidemic disease is of the highest national importance, and nothing can conduce to this more than the thorough harmony of our veterinary surgeons and physicians.

The importance of this has often been brought under the notice of the government and the public in recent years; nor is good veterinary training a light matter. It is no exaggeration to say that the proper treatment of our domestic animals requires more knowledge and skill than that of man himself, and in this regard comparative anatomy, physiology and medicine are more broadly scientific in their scope than the medical course itself used to be. Fortunately for man himself the views of faculties of medicine have broadened in this respect, and thanks, in some degree, to comparative medicine, we ourselves are now exempt from diseases contracted from domestic animals or through their agency. The subject has also its moral aspect, even its religious aspect. In the decalogue itself, which is usually said to define our duties to God and our fellow men, we have a duty to define to our dumb friends and servants—that of sharing with them our Sabbath rest, which

carries with it all the duties that relate to their well-being in other respects, and if the merciful man is required to be merciful to his beast it is also true that God's mercy to the man depends on his merciful disposition to all under him. Thus the moral elevation and true civilization of a people may be gauged by the intelligent and kindly care of these lower creatures over whom God has given them dominion, and which it is in many cases evident that he has fitted with structures and instincts specially fitting them to be the servants and companions of man. From all these points, whether utilitarian, scientific or moral, ever lover of his country should sympathize with, and aid the good work done by our Faculty of Veterinary Science and Comparative Medicine, and its graduates should be held to occupy a high place in professional standing.

Mr. John Gadsden on being called on said: As one of the examiners of the Class of '94, who have just been awarded their diplomas, I wish merely to say that I have assisted at the examinations of this college for ten years, and each year with a higher appreciation of the high character of the teaching conducted by this faculty.

I have had thirty-five years experience as a practitioner of veterinary science, and have had every opportunity of observing its rise and progress, both in England and throughout the continent of America, and I pay no empty compliment to this school when I say that it has been an important factor in that progress.

I know from experience that your teaching staff are all men who do honest work, not for pecuniary gain, but for pure love for the work, and I only hope that the day is not far distant when they will be provided with necessary facilities of carrying on their good work under more favorable conditions than they at present enjoy.

Travelling as I do a great deal throughout the United States I meet many members of the profession, but when I meet a McGill man, I meet a gentleman in every sense of the word, and I find them prosperous and respected.

I thank you for the opportunity of saying these few words and for the privilege of being present here to-day, and I will conclude by repeating what I said yesterday, that wherever I may be, even if settled again in old England, I will take pleasure in even crossing the Atlantic, much as I detest the sea, to do what I can to assist at your examinations.

CLINICAL REPORT.

HYDRAMNIOS.

By W. G. Benner,
Doylestown, Pa.

Case.—Five year old Aberdeen cow, property of Dr. H. ——. Saw her 28th of March. On the way to the farm I received the following history: Bull at large with the cows, but judging from the date of last parturition, she would be about eight and one-half months pregnant. Had been healthy up to two weeks previous. Appetite during the two weeks indifferent, bowels costive, which he informed me he corrected with frequent one-pound doses of sulph. magn. During this time he first noticed the unusually enlarged abdomen, but attributed it to twin calves. Respiration hurried, at times, and the expiratory act occasionally accompanied by a grunt.

Upon examination found the following: Abdomen enormously distended; respirations, thirty per minute; pulse, fifty-five; temperature, 102° F. at rectum; refused feed of any kind; bowels constipated; rectal examination revealed distention due to an abnormal accumulation of water in utero.

Diagnosis.—Dropsy of amnion. Gestation being so nearly completed, and the cow very weak after the frequently repeated purgations during the two weeks, I prescribed tonics, with instructions to inform me if she should not regain appetite within a few days.

Was called again April 8, 11 a. m., when attendant informed me that she had done very well up to night of 7th, when the same symptoms reappeared—refused food. Found the same symptoms in general as at the first call, with the addition of a notable increase in abdominal dimensions.

Considerable ingesta had accumulated in the canal, which added materially to the bulk in abdomen. Also found a hernia in the left iliac region, with the gravid uterus protruding under

the skin in form of a fluctuating tumor, size of the crown of a hat. Upon vaginal exploration, found the distended uterus projecting into the pelvis to within a few inches of vulva, the os buried and resting on the anterior brim of pubis.

The symptoms being alarming, I immediately proceeded to induce labor and hasten delivery.

By irritating and dilating the os sufficiently to admit my first two fingers—which act was accomplished with little difficulty—I procured labor pains within one-half hour.

Unfortunately, I was compelled to leave at this stage to attend to a severe injury to a valuable stallion, but returned at 9 p. m., when I was informed that she labored intermittently until 6 p. m. Found the cow advertently eating hay with the usual anxious expression accompanying this epoch.

Examination per vagina revealed the os effaced, the "water-bag" protruding to about three inches from vulva, its extreme thickness and the feeble maternal efforts preventing it from rupturing. With difficulty I ruptured it with the fingers, when at the lowest estimate (mine as well as the doctor's who was present throughout), eighteen gallons of a clear liquor was discharged, which ran with a roar down the trough back of the cattle. Concomitant with the discharge of the liquor, the tumor in flank disappeared.

I now explored the uterus in quest of a calf, which before this time I had been unable to detect. Even after inserting my arm to the shoulder, which I might mention is longer than the average, proportionately, I was unable to reach or touch it. The cow was large, the alimentary canal almost empty, and the uterine dimension at this time enormous. I waited patiently for about fifteen minutes, when the cow lay down and resumed to labor. Concomitant with the contraction of the uterus, the calf appeared at the brim of pelvis in the dorso-lumbar position, and with little assistance, a medium-sized live calf was delivered.

A few minutes after the cow made futile attempts to rise. With assistance she was gotten up, but at once showed evidences of speedy dissolution from shock. Nose was elevated, mouth open with tongue protruded, angles of mouth retracted, staggering, pulse almost imperceptible and about 130 per minute, breathing extremely shallow. I quickly offered her a quart of cold water which she drank with relish, after which

the urgent symptoms subsided. The poor animal presented a pitiable sight—appeared completely disemboweled. The flanks almost touched each other.

Administered diffusible stimulants followed with three gallons of warm bran slop. After thus partially displacing the vacuum, she brightened and called for the calf, which by this time was turning somersaults in its efforts to arise. Pulse at this time seventy and regular. Left fœtal membranes intact in order to stimulate uterine contraction. After giving her a liberal allowance of hay and attending to her comfort, she was left for the night.

April 9, 10 a. m. Facial expression, haggard; temperature at mouth, 100° F.; pulse, 100, weak. She ate sparingly of hay; refused gruel of all kinds.

Continuous discharge of undigested ingesta; congestion and nervous incoördination of bowels. Prescribed milk, eggs and whisky, under which she regained some appetite and intestinal tonicity in two days. She partook of food sparingly for about a week, when grass was obtained for her, which set her to rights. Cow had the liberty of a roomy stable.

Ten days after parturition I saw the cow and noticed the rupture had not united, and the intestines protruding beneath the skin, and having almost completely recovered from parturition, I made preparation to cast animal, bring lips of muscles together, but the doctor concluded to make the best out of her and dispose of her for beef.

Remarks.—Have seen several mild cases during my experience, but this was by far more than I thought could be possible. Should I be so fortunate as to have another unfortunate with this affection, and similar conditions extant, I should withdraw sufficient liquor from time to time, to render her comfortable. It would not only ameliorate the sufferings, but would avoid the useless expenditure of the extra nerve force generated for the approaching event. It required the puncturing of two receptacles of equal capacity, according to the amount discharged, to empty the uterus. Whether the fluid was contained in one sack or a dozen, would be impossible to conjecture before operating, but I should operate through os, and if a sufficient quantity could not be obtained to have the desired effect, I should tap at the flank with trocar and canula.

Whether the removal of the contents of one sack would suffice, by removal of resistance and support, to rupture or relax another into the one partly emptied, would be evidenced by the effect.

There were no swellings of limbs or along the belly.

The uterus expelled the fœtal membrane during the night, and has regained its normal size and position. Cow showed signs of œstrum four weeks after parturition, but will not be bred. Both made good recoveries except for the rupture, with which the owner refuses interference.

THERAPEUTIC ABSTRACTS.

Defay's Hoof Cement is an excellent preparation for building up the plantar border of a hoof from which horn has been broken away, or for obliterating defects at other points of the hoof. ℞ Resin. guttaperchæ, ℥iij ; ammoniaci (gum), ℥iss. Melt over a slow fire, stirring actively till a homogeneous mass is obtained.

This warm and pliable mass is to be moulded in place upon the hoof by means of a red-hot iron spatula. To increase the intimacy and durability of the union between the horn and the cement, the former should first be slightly roughened with a hoof knife, and then rubbed with a small sponge drenched with ether or chloroform to remove all oil from the horn.

The mass cools and hardens in a few minutes, and the process may be hastened by dashing cold water upon it.

Salol is a chemical union of salicylic and carbolic acids, and is destined to become a valuable therapeutic agent.

1. *Externally*, in the form of the powder, or in alcoholic solution (1 to 10), it has a decided *disinfectant* and *antiseptic* action upon wounds, ulcers and catarrhal inflammations of the skin and mucous membranes (stomatitis, otorrhœa).

2. *Internally*, salol is an *antipyretic*, and almost a specific in *muscular* and *articular rheumatism*. For rheumatism it is to be preferred to salicylic acid, or the salicylates, because it gives more certain relief, is tasteless, and non-irritating to the stomach. In the alkaline fluids of the small intestines salol is

decomposed into salicylic and carbolic acids, and appears in the urine partly as salicylic and salicyluric acids and partly as a sulpho-carbolate. The urine, therefore, shows the brownish-green coloration (hydrochinon) of urine secreted after administration of carbolic acid. In consequence of the excretion of salol as salicylic acid it is being prescribed for pyelitis and cystitis.

Fröhner strongly recommends salol for acute articular rheumatism and to a less degree for acute muscular rheumatism in the dog. It is especially valuable in the treatment of lumbago rheumatica in the dog.

An alcoholic solution is very serviceable in auricular catarrh of the dog.

Administration.—Internally it is given to the dog in powder, and to the horse in an electuary or bolus. For rheumatism it should be given in small doses and repeated from three to five times daily, but as an antipyretic in one large dose each day. Doses:

Horse and ox, ʒiv to ʒvj; as febrifuge, daily, ʒjss. to iij.
Large dog, grs. viij to grs. xv; as febrifuge, daily, ʒss. to j.
Small dog, grs. jv to grs. viij; as febrifuge, daily, grs. xv to xxx.
Cat, grs. 1½ to 3; as febrifuge, daily, grs. viij to xv.

℞ Saloli, grs. x.
Fiat doses No. X.

Sig.—Give one powder every three hours. For a dog with lumbago rheumatica.—Fröhner's Thierarzneimittel.

VETERINARY EDUCATION.

To the Veterinary Magazine:

Owing to the fact that it has not been feasible to convene the Congress during the past winter session of the various veterinary schools, after thorough consideration the Committee on Congress of Colleges have decided to call a meeting of the same at Buffalo, N. Y., on Saturday, July 14, and notice is hereby given to all veterinary colleges, and it is hoped that by fixing this time that all will be prepared to send delegates to consider the subject of veterinary education in this country.

By order of the chairman,

W. Horace Hoskins.

VETERINARY NEWS.

INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY.

The Eighth International Congress of Hygiene and Demography will assemble in Budapest, September 1 to 9, 1894. It comprises a section of "Veterinary Medicine," in which the following subjects are discussed:

1. Preventive inoculation against anthrax and swine-plague.
2. Preventive inoculation against bovine pneumonia.
3. Inoculation against symptomatic anthrax.
4. Diagnostic value of tuberculin.
5. Of mallein.
6. The pneumo-bacillus and pneumo-bacillin.
7. Organization for meat inspection.
8. Regulation of the production of milk from a sanitary point of view.
9. Disease-producing parasites.
10. Means for preventing the propagation of tuberculosis.
11. Prophylactic measures against aphthous fever.

—

Apropos of the anti-Semite demands in Germany that legal proceedings be undertaken against the Hebrew mode (as prescribed by the ritual) of slaughtering animals, on the ground that it involves cruelty, a book has just been published which contains the views of 253 prominent men on the question. Of this number, fifty-three professors of physiology and pathology, including Professor Virchow and Sir Joseph Lister, Surgeon Extraordinary to the Queen of England, and Professors Dubois, Reynaud and Pettenhofer; 151 veterinary surgeons and fourteen leading proprietors of slaughter houses assert that the Hebrew mode of slaughtering animals is the least cruel, and that nothing can be said against it from the point of humanity.

BALTIMORE, MD., April 19, 1894.

To the Editor VETERINARY MAGAZINE.

Dear Sir:—Herewith you will find a copy of the law regulating the practice of veterinary medicine and surgery in Maryland. By the fifteenth section much latitude is given the owners of animals outside the city of Baltimore, to which place, not being in any county, the Act applies strictly. This modification of the bill was found necessary on account of the few veterinarians practicing in the counties. You will oblige me by publishing the law with this letter for the benefit of students and others intending to practice in this State.

Yours truly,

A. W. CLEMENT,
Secretary.

AN ACT to regulate the practice of Veterinary Medicine and Surgery in the State of Maryland.

SECTION 1. *Be it enacted by the General Assembly of Maryland*, That a commission is hereby established to be known under the name and style of "The State Veterinary Medical Board," to consist of five commissioners who shall be members in good standing of some school of Veterinary Medicine, who shall be appointed by the Governor every four years, and who shall hold their office until their successors are duly appointed and qualified with power in and to said board to adopt by-laws and regulations, such as they may deem advisable to carry into effect the provisions of this act, provided the said by-laws shall not conflict with the Constitution or laws of this State or of the United States.

SEC. 2. It shall be unlawful for any person or persons to practice Veterinary Medicine and Surgery in the State of Maryland without having previously obtained a diploma from a college duly authorized to grant such to students of Veterinary Medicine and Surgery or to those who have passed satisfactory examinations before the State Veterinary Medical Board or as herein provided for.

SEC. 3. The said State Veterinary Medical Board shall hold their meetings at such times and places as they may deem best, which times and places shall be set out fully and regularly in their by-laws.

SEC. 4. The said State Veterinary Medical Board shall examine all diplomas as to their genuineness, and each applicant not holding a diploma shall submit to a theoretical and practical examination before the State Veterinary Medical Board, said examination to be written, oral or both, which examination, if passed to the satisfaction of the said Board, shall entitle the applicant to practice Veterinary Medicine and Surgery, subject to provisions and regulations of this Act, and regulations of the said Board.

SEC. 5. All examinations of persons not graduates shall be made directly by the State Veterinary Medical Board, and the certificates given by the said Board shall authorize the possessors to practice veterinary medicine and surgery in the State of Maryland. All examinations of un-graduated practitioners must take place before the thirty-first day of December, eighteen hundred and ninety-four. After that date no certificate shall be granted except to persons presenting diplomas from legally chartered colleges.

SEC. 6. Any person shall be regarded as practicing Veterinary Medicine and Surgery, within the meaning of this act, who shall have received a license as mentioned in Section 4. But nothing in this act shall be construed to prohibit members of the Medical profession from prescribing for domestic animals in case of emergency and collecting a fee therefor, nor to prohibit gratuitous services in an emergency, nor to prevent any person from practicing Veterinary Medicine and Surgery on any animal belonging to himself or herself. And this act shall not apply to commissioned Veterinary Surgeons in the United States Army.

SEC. 7. *And be it enacted*, That it shall be the duty of such Board to keep a register of all practitioners qualified under this act practicing Veternary Medicine and Surgery or any branches thereof, in this State, and to cause the same to be published at least once a year in two newspapers published in the City of Baltimore.

SEC. 8. *And be it enacted*, That the said Board shall within six months from the date hereof, prepare and register, in which the names of all graduate practitioners in the State at the time and in actual practice shall on application to the said Board, be inserted without examination, and shall also on application insert the names of such persons who are practitioners in actual

practice without a diploma or certificate of qualification from a recognized school, who have been in practice for five years and upwards prior to the passing of this act upon proof to the said Board, that they have been so practicing, that all persons practicing at this time and not having been so practicing for five years antecedent to this act, shall undergo an examination before the said Board, and if found by said Board competent to practice, the persons so examined and approved shall be entitled to registration.

SEC. 9. *And be it enacted*, That the said Board shall have power to reject any applicant for registration whose examination papers or diploma are not satisfactory.

SEC. 10. *And be it enacted*, That on and after six months from the date of the approval of this Act, no person shall be permitted to practice Veterinary Medicine or Surgery or any branch thereof, in the State of Maryland, who does not possess a diploma issued from a College or School of Medicine, duly incorporated and legally licensed to issue diplomas, and if said diploma shall be issued after the first day of January, 1895, it shall be received only from a College or School of Veterinary Medicine which shall require a three years' course of study before issuing said diploma, and shall have passed such examination or test, as the case may be, from time to time, instituted as a test of qualification by such Board, and persons producing such certificates or diplomas who pass such test examination shall, on payment of such fees as hereinafter are provided for, be registered as Veterinary Practitioners.

SEC. 11. *And be it enacted*, That no moneys shall be paid out of the State Treasury for the use or purposes of said Act.

SEC. 12. *And be it enacted*, That any person not registered who shall practice Veterinary Medicine and Surgery or any branch thereof, within the State of Maryland, shall be deemed guilty of a misdemeanor and shall be fined in the sum of not less than one hundred, not more than five hundred dollars for each offence, or imprisonment in the House of Correction for any term not less than three months, nor more than twelve months, for each and every offense.

SEC. 13. *And be it enacted*, That the said Board shall be the prosecutor in all cases under this act and that such fine and imprisonment may be imposed by any Justice of the Peace of

the City of Baltimore, or any county where such offense may be committed.

SEC. 14. *And be it enacted*, That a moiety of the fine imposed under this act shall be paid to the informer, and the other moiety shall be paid into the county treasury wherein the offense shall be committed.

SEC. 15. *And be it further enacted*, That in any part of any Election District of any county in the State where it may not, in the judgment of the owner of the animal, be advisable to secure the services of a duly authorized Veterinary Surgeon, then the person or persons desiring to obtain advice as to the physical condition of any animal or animals belonging to him or her may procure the services of any person that he or she may desire, to give such advice or to perform any services for the relief of his or her animal or animals that may be necessary.

SEC. 16. *And be it enacted*, That this act shall take effect from the date of its passage.

Approved April 6th, 1894.

FRANK BROWN,
Governor.

{ THE GREAT SEAL OF THE STATE. }

JAMES H. PRESTON,
Speaker of the House of Delegates.

JOHN WALTER SMITH,
President of the Senate.

State of Maryland, Sct: I, J. Frank Ford, Clerk of the Court of Appeals of Maryland, do hereby certify that the foregoing is a full and true copy of the Act of the General Assembly of Maryland of which it purports to be a copy, as taken from the Original Law belonging to and deposited in the office of the Clerk of the Court of Appeals aforesaid.

In testimony whereof, I have hereunto set my hand as clerk, and affixed the seal of the said Court of Appeals this thirteenth day of April, A. D. 1894.

[SEAL.]

J. FRANK FORD,
Clerk Court of Appeals of Maryland.

IN MEMORIAM.

Following is the report of a committee on resolutions appointed at a special meeting of The Massachusetts Veterinary Association, April 4, 1894.

WHEREAS, Death has removed from among us our beloved member, Dr. John S. Saunders, and

WHEREAS, We feel *deeply* the loss sustained by us in the early demise of one whom we all have respected as a professional brother, and loved as a genial companion,

Be it Resolved, that we hereby express our appreciation of his sterling qualities—honesty, charity, good fellowship, were the traits of his character. Devoted to his profession, an untiring worker, charitable to his colleagues, speaking ill of no man, his example is one for us all to emulate. By his death our association loses a valued member, the veterinary profession an ardent worker, the community an honest citizen.

Be it Resolved, that a copy of these resolutions be spread upon the records of our association, also forwarded to the family of deceased, and to the veterinary journals for publication.

[Signed] L. H. HOWARD,
AUSTIN PETERS,
JOS. H. STICKNEY,
F. H. OSGOOD,
H. P. ROGERS,
A. MARSHALL.
} *Committee.*

WANTED.—A Veterinary Surgeon, at Carrollton, Carroll County, Missouri. An experienced man preferred. Call or write at once.

OHIO VETERINARY COLLEGE,

135 Sycamore Street, - CINCINNATI.

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FREDERIC KEBLER, M. D., Professor of Pathology.
JULIUS H. EICHBERG, M. D., Ph. G., Professor of Materia Medica.
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WM. DICKORE, A. M., Ph. D., Professor of Chemistry.
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THE
VETERINARY MAGAZINE.

VOL. I. JUNE, 1894. No. 6.

TESTICULAR TEETH, HAIR AND BONE.

BY T. D. HINEBAUCH, M. S., V. S.
Fargo, N. D.

Last October Dr. Mohney, a graduated veterinary surgeon of Goodland, Ind., called my attention to the specimen illustrated in Fig. 1.

The history of the case is as follows: "I was called June 12 by Mr. John Weise of Goodland, Ind., to operate on what he supposed was a cryptorchid. Found the subject to be a two-year-old Arabian (?) colt in good condition for operating. It is not necessary to describe the method of operation, but will describe as near as I can the condition of the testicle. Left testicle normal in location and size. Right testicle about the size of a kidney, which it much resembled in shape, and was located in the abdominal cavity. It was hard and nodulated.

"On laying the testicle open with the knife I found a bony structure imbedded in a cavity containing pus. The bone resembled in shape the squamosal bone. With it was also found a hair, white in color (color of colt). On continuing the incision another cavity was laid open. This second cavity contained a tooth-like substance."

On making examinations of the specimens we found *B* (Fig. 1) very much resembled a molar tooth in external appearance. The table surface bore a close similarity to a permanent molar just before it cuts through the gums. The indentations on the table surface, three in number, were three-eighths of an inch in their greatest depth. The shallowest one was one-eighth of an inch deep, smooth and covered by dentine.

The pulp cavity is well represented in Fig. 2 (*A*), and extended to within one-eighth of an inch of the table surface. A cross section (Fig. 2) one inch from the table surface measured one inch at its largest diameter, and three-fourths of an inch at its smallest diameter.

The portion of the tooth substance on the outside of the pulp cavity varied in thickness from one-sixteenth to one-eighth of an inch. The pulp cavity also varied in size from one-sixteenth to three-sixteenths of an inch, and enveloped two distinct portions of tooth substance separated from each other by a very thin membrane, the larger of which is five-eighths by one-fourth inch in diameter, and the smaller three-eighths by three sixteenths of an inch in diameter. The larger por-

FIG. 1.

Original. *A* Side view of bony substance taken from testicle of horse. *B* Side view of tooth taken from same testicle.

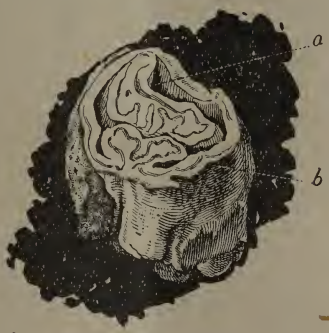
tion is nearly rectangular in shape, while the smaller is triangular. Each of these divisions consists of dentine, enamel and cementum.

Dentine covered the external surface of the lower portion of the tooth, except in two places, each about as large as a small finger nail, where the enamel formed the external covering. The upper portion is partly covered by cement.

Microscopical sections, both cross and longitudinal, of the above specimen showed the dentine to consist of a number of minute wavy branching tubes (dental tubuli). These tubes when compared with the tubes of an adult molar tooth are

somewhat finer, but have the same direction with reference to the pulp cavity as do those in the adult tooth. When compared with a partly formed molar tooth the tubes are found to be of about the same size. We also compared them with the dental tubules of wolf teeth and found them almost identical in structure, size and number. It has been suggested to us that the tubuli received their shape and appearance from the deposition of calcareous material in the tubuli seminiferi. Making an estimation of the entire number of tubuli seminiferi in the testicle on a basis of four hundred lobuli testis (Krause) and three tubuli seminiferi to each lobulus, we have twelve hundred tubes in the entire organ. The above estimation is based on the greatest number of lobuli and also on the

FIG. 2.



Original. Cross section of tooth represented at *B, Fig. 1* *a* Pulp cavity. *b* Enamel and dentine.

greatest number of tubes in each lobulus, hence the estimate will be rather above than below the average.

When we take into consideration that a microscopical section from the tooth substance of the testicle, one-fourth inch square contains many more tubes than the whole testicle, we will readily see that the presence of the tooth substance was not the result of a deposition of earthy material in the seminiferous tubes.

The bony portion, as we call the second specimen (*A*, Fig. 1), when viewed from one position very much resembles the squamosal bone. Its greatest length is two and thirteen-sixteenths inches, its greatest width one and five-sixteenths inches, and its greatest thickness three-fourths of an inch.

Externally it is white and dense, the compact tissue being very thin, the internal portion spongy and the cells filled with large quantities of a yellowish, fatty material.

Microscopically in the dense portion true bone cells, in appearance, were observed. We have the Haversian canals, lamellæ, lacunæ and canaliculi.

The interior portion is cancellated and near the centre contains a few bone cells gradually disappearing from without toward the centre, all the spaces being filled with fat. On the external surface numerous markings are seen which probably (?) were due to close contact with the hair contained in the cavity. Small openings, very much resembling the openings of Haversian canals on the surface of the bone, are readily made out when placed under the microscope.

Taking the appearances, both microscopic and macroscopic into consideration, we can scarcely help believing that we have true tooth substance in specimen *B*, Fig. 1, and true bone substance in *A*, Fig. 1. Whether it would be proper to call the one tooth and the other bone within the strict meaning of these terms I am unable to decide. But it seems to me that it certainly would not be a misnomer to designate them as such.

There appears to be some objection on the part of not only veterinarians but also scientists, to calling the specimens *bone* and *tooth*, respectively; the expressions *bone-like* and *tooth-like* substance are preferred by them. They do not hesitate to call hair-like substance found in the ovary and testicle *hair*. Logically bone and tooth would apply the same to tissues of that nature when found in the same position.

Origin of Teeth, Hair and Bone.

Teeth in their natural position are regarded as a production of the mucous membrane. They are formed by an ingrowth of the epiblast which meets a connective tissue papilla, hence they are epiblastic structures.

Hair is developed in the deep layers of the epidermis (epiblastic) which project into subjacent dermis. Thus we see hair is produced by epiblastic membranes, and organs containing hair will of necessity be of epiblastic origin.

The origin of the testicle is both mesoblastic and epiblastic. It is epiblastic in that it is partially formed from epithelial

cells derived from epiblastic membranes. It is mesoblastic in so far as it is derived from Wolffian bodies. The tubes of the Wolffian bodies probably give rise to those divisions of the testicular tubuli known as the *vaso recta* and *rete vasculosum*.

"The *vasa deferentia* [1] appear to be derived from the glandular tubes of part of the Wolffian body. The Wolffian duct itself becomes in the male the vas deferens, and the convoluted canal of the epididymis; the latter structure except the head being entirely derived from the Wolffian duct."

Taking the origin of these three tissues, viz.: bone, hair and teeth, into consideration, and then noting their presence in an organ, it would appear to us that it is a further evidence that that organ is developed from epiblastic and mesoblastic tissue. On the other hand, the fact that the testicle is both epiblastic and mesoblastic in its origin is sufficient to account for the presence of both tooth and hair (epiblastic tissue) and bone (mesoblastic tissue).

We believe the above explanation is sufficient to indicate the origin, and the occasion for finding substances, such as have been described, outside of their natural position. If we investigate the origin of the various organs of the body from the different membranes from which they are developed, it will help to clear up a great many of the so-called mysteries in connection with cases of this kind.

From the epiblast are developed the central nervous system and epidermal tissues, including the epithelium of the same organs.

From the hypoblast are developed the intestinal epithelium, except that of the mouth and rectum, and that of the glands opening into the intestines; also the epithelium openings into the air passages.

From the mesoblast are developed the vascular, muscular and skeletal substances, the generative glands and excretory organs.

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[1] Comparative Embryology, Balfour.

INTESTINAL HERNIA INTO THE FORAMEN OF WINSLOW.

By S. J. J. Harger.[1]

The theme of my discourse to-night will be "Intestinal Hernia into the Foramen of Winslow," four cases of which I found reported by Pécus in the March number of the *Journal de Médecine Vétérinaire et de Zootechnie.*

Synonyms.—Retro-peritoneal, pancreatic hernia. Exceedingly few instances of intestinal displacement of this anatomical variety have been recorded either in human or in veterinary surgery. It is this fact more than any other which has led me, and in order that I may not disappoint you to-night by not having a paper prepared for this meeting, to select this subject. Included in the generic name "colic," this lesion is one of those obscure conditions in which an ante-mortem diagnosis can only be made with the greatest difficulty.

Among the domestic animals, it has only been recognized in the horse, in which it was orginally observed in autopsy by Printz, and afterward by Husson, Roell, the author and a number of other veterinarians. It is mentioned in Friedberger and Fröhner's "Pathologie und Therapie der Hausthiere" and in Zundel's "Dictionary." The term pancreatic hernia is incorrect. As has been the case in many other pathological conditions, it was the autopsy-room which aided in its discovery. Besides, it is to me a very interesting alteration, not alone from its clinical aspect, but also from the fact that it involves a peculiar anatomical condition in the abdominal cavity—the disposition of the foramen of Winslow.

This species of hernia may be defined as an accidental displacement of a portion of the small intestine (the posterior portion of the jejunum or the anterior part of the ileum) into the foramen of Winslow.

The Foramen of Winslow.—The cavity of the peritoneal sac is divided into two great compartments: an anterior and a posterior, communicating by means of an aperture, a sort of constriction, which is the foramen in question. The anterior compartment, which is quite small, is post-gastric. It is circumscribed in front by the posterior face of the liver and the

[1] Read before Philadelphia Veterinary Medical Society.

stomach, the great omentum which plays the principal rôle in its formation, the gastro-hepatic and the gastro-splenic ligaments and the lobus Spiegelii; below and behind, by the great omentum itself, the anterior surface of the fourth portion of the folded colon; on the left by the peritoneal ligament which unites the spleen, the liver, the cordia and the diaphragm and by the omentum; on the right, also the omentum, the hepato-duodenal ligament and the right kidney; above, by the superior abdominal parieties. The completion of this cavity is effected principally by the great or gastro-splenic omentum which, after leaving the greater curvature of the stomach, passes backward to terminate on the fourth portion of the folded colon and the origin of the floating colon; on the left side, to the sublumbar region and the left kidney where it suspends the stomach and the spleen; to the right, where it is continuous with the duodenal mesentery, thus aiding in circumscribing this cavity below and on the sides. The posterior compartment, much more extensive, corresponds to the position of the small and large intestines and the cæcum.

The orifice of Winslow connecting these two cavities and more or less obliterated under ordinary conditions by the intraperitoneal pressure, is situated in the sublumbar region close to the median line and in front of the right kidney. It is about two inches long, extends obliquely from behind to before, from right to left and above to below, and has more or less tense resisting walls. It admits of the introduction of two fingers and, besides its peritoneal lining, is circumscribed by the surface of the fourth portion of the folded colon, the upper face of the right extremity of the pancreas, the venæ portæ, and the posterior vena cava. It can be seen only from the right side of the animal where it may be found by passing the index finger into this region. It is conical in shape; the posterior extremity is a little wider than the anterior. The latter is in close proximity to the smaller curvature of the stomach.

The embryological formation of this foramen can be traced schematically, though this it is not necessary to do at the present time. Suffice it to say that its primitive formation is due principally to the presence of the anterior and the posterior mesogastrium, two peritoneal folds in the fœtus extending respectively from the duodenum and the smaller curvature of the stomach to the diaphragm, and from the greater curvature

of the stomach to the roof of the abdominal wall; to the development of the liver between the two layers of the anterior mesogastrium and the spleen in the posterior; finally, to the transverse rotation of the stomach whose axis is primarily longitudinal.

Anatomical Alterations.—A spurious form of this variety of hernia may exist when the intestine enters this compartment through a rupture in the omentum instead of penetrating Winslow's orifice.

According to Zundel and other observers, the contained hernia is constituted only by the small intestine (ileum and jejunum). In man, it may be the cæcum, the ascending or the transverse portions of the colon or the ileum. In the horse, the strangulated intestine, which may vary from six to fifteen feet, shows the same pathological alterations that are seen in other hernias, such as congestion extending to the seat of strangulation, arrest of the circulation, gangrene, etc. In one case it was complicated by a volvulus. The orifice also is infiltrated, congested and sometimes dilated.

This kind of intestinal displacement would undoubtedly occur more frequently were it not for the high situation of the orifice in the sublumbar region and the gravitation of the intestinal mass. I doubt very much, contrary to others, that the orifice is gaping, by reason of the intra-abdominal pressure which is continually exerted. This is not its condition in the horse after death.

Causes.—Among the *predisposing* causes I may mention the length and attachment of the mesentery, the mobility of the small intestines, their diameter, the compressibility and suppleness of their walls, the nature of their contents (liquid or solid)—conditions not highly fulfilled in the large intestines.

The *exciting* cause, of course, must be an intestinal displacement from mechanical causes, such as rolling after coming into the stable from work, or from abdominal and thoracic pain, falling down, etc.

Diagnosis.—There is no diagnostic sign in such conditions, and the symptoms can not be differentiated from those which accompany some other abdominal diseases. Such lesions, as volvulus, the one in question, and others very obscure, can be diagnosed, but it is often a snap-diagnosis, and one the result of a combination of circumstances rather than of scientific

differentiation. In the dog, exploratory laparotomy may be attempted, inasmuch as in this animal there is but little danger in opening the abdominal cavity.

Symptoms.—The symptoms are not characteristic and can not be differentiated from a number of other diseased conditions that belong to the family of "colics." They resemble those of a violent intestinal congestion without the true febrile conditions which we know accompany congestion of the intestines. The animal at intervals assumes the "canine position;" that is, sits on his hind quarters with the thighs under the body and the front legs extended to relieve the tension on the post diaphragmatic region, which may lead one to suspect a rupture, a volvulus or some other obstruction. This peculiar position of the horse is not, as many believe, by any means characteristic of these conditions. We often see it in a marked degree in animals which make a speedy recovery.

In man, these symptoms which may be similar to those under like conditions in the dog, commence very suddenly with violent vomiting, arrest of discharge of fœces, and pain in the region of the epigastrium. If the strangulated intestine is much distended with gas, tympanitic enlargement of the abdomen may be detected.

Treatment.—The treatment is practically nil. If the intestine is not yet strangulated, it may by chance become dislodged by the violent movements of the animal (rolling and walking).

Laparotomy (in the upper part of the right flank) is perhaps feasible but not very practical. In the dog, opening of the abdominal cavity is harmless and may be of diagnostic as well as therapeutic value. It is thus possible to make the dislocation tangible, but it is of value only when the hernia is still reducible. The anatomical boundary of the orifice is such that incisions with the herniatome would be such as to result fatally.

In mild cases, in which the intestinal loop is not strangulated, a spontaneous reduction might possibly be effected by increasing peristalsis of the bowels by administering subcutaneously a full dose of sulphate of eserine.

Autopsies.—Mare, four years, died November 29, 1888. The small intestines were slightly congested over the greater part of their length, and presented close to their origin from the stomach a portion about two metres long, doubled on itself,

violet-black color, which had penetrated and was strangulated by the foramen of Winslow. The interior was filled with dark-colored uncoagulated blood, and the mucous membrane was very friable. (Autopsy three hours after death.)

2. Horse, eight years, died February 3, 1889. The greater number of the abdominal organs presented a bluish tint in the vicinity of the vessels, showing a commencing putrefaction, and about two metres of the small intestine was the seat of an intense congestion. There was a portion of the jejunum about sixty centimetres long lodged in Winslow's foramen. The constriction was not very marked and the loop of intestine could be readily extracted with the hand without lacerating any of the tissues. The strangulation not being complete, death took place slowly and the intestine was not gangrenous. The congestion was not limited, but extended over two metres of the intestine.

3. Danish mare, eight years, died June 5, 1889. Had colic on the third and fourth of May, 1886. Peritoneum normal. About two metres of the anterior portion of the jejunum presented the usual appearances of passive congestion, and after slowly pulling the small intestine from the abdominal cavity it was found that this portion had formed a strangulated hernia through the foramen of Winslow. (Autopsy immediately after death.)

4. Mare, four years, died July 3, 1889. On opening the abdominal cavity a large quantity of dark-colored serum escaped. Five to six metres of the small intestine was dark-colored, filled with a hemorrhagic fluid contents, and was found to have formed a hernia through the foramen of Winslow. (Autopsy three hours after death.)

These cases again demonstrate the value and necessity of making autopsies, not in a perfunctory manner, but with the greatest scrutiny.

Radius.	External side of the superior articular surface. External side of the inferior articular surface.
Principal Metacarpus.	External side of the superior articular surface. External condyle.
First Phalanx (Anterior).	External side of the superior articular surface. External condyle.
Coxa.	The most anterior part of the external angle of the ilium. The most posterior part of the ischiatic tuberosity.
Ilium.	The most anterior part of the external angle of the ilium. Bottom of the cotyloid cavity.
Ischium.	The most posterior part of the ischiatic tuberosity. Bottom of the cotyloid cavity.
Femur.	Summit of the articular head. External condyle.
Tibia.	Base of the spine. External side of the inferior articular surface.
Principal Metatarsus.	External side of the superior articular surface. External condyle.
First Phalanx.	External side of the superior articular surface. External condyle.

It is well to measure both members of the anterior and posterior biped in each subject and take their mean measurement, because we have observed, with M. Cornevin, that frequently there is a variation of two and even three millimetres between the homologous bones of the same biped.

A. Proportions of the Long Bones of the Members in Relation to the Height.

(*The latter being represented by 100.*)

M. Colin, in his *Traité de Physiologie*, gives the following figures as expressing the mean length of each of the bones of the members in the horse, the ass and the mule, without mentioning, however, the height of the animal measured or the external known points from which the measurement was made.

	Scap.	Hum.	Rad.	Metac.	Phalanges.	Coxa.	Femur.	Tibia.	Metat.	Phalanges.
	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.
Horse	0.37	0.31	0.36	0.24	0.17	0.45	0.39	0.36	0.28	0.18
Ass	0.23	0.18	0.24	0.16	0.11	0.28	0.24	0.25	0.19	0.10
Mule	0.32	0.25	0.32	0.22	0.17	0.40	0.35	0.33	0.26	0.165

M. Lemoigne has also studied the length of the bones of the extremities of the horse from a point of view of the mechanism of locomotion as well as of traction.[1] The following table gives his results from forty horses; the measurement being made upon the living animal and from a fixed external point corresponding approximately to the centre of the articulation.

	Medium.	Maximum.	Minimum.	Mean.	Relation per 100.
	m.	m.	m.	m.	
Height at withers	1.53	1.64	1.41	1.55	100
Height at croup	1.53	1.63	1.41	1.54	99
Scapulum[2]	c.431	0.46	0.39	0.44	28
Humerus	0.246	0.275	0.21	0.24	15
Radius	0.378	0.40	0.35	0.38	24
Carpus	0.048	0.06	0 035	0.05	0.032
Metacarpus	0.239	0.26	0.215	0.24	15.4
Coxa	0.439	0.48	0.37	0.44	28
Ilium	0.365	0.43	0.31	0.37	223
Femur	0.34	0.37	0.299	0.34	21
Tibia	0.387	0.45	0.35	0.39	25
Tarso-metatarsus	0.347	0.38	0.31	0.35	22

M. M. Neumann, in his *Mémoire sur les aplombs* (in *Journal des Vétérinaires militaires*, t. viii), Goubaux and Barrier, in their *Traité d'exterieur*, adopted as means the figures of M. Colin, which they claim to have verified. These are to our knowledge the only researches upon the proportions of the bones of the members relative to the height which we have up to the present time; without underrating them they are quite incomplete.

Below are the results of my researches:

	Humerus.	Radius.	Metacarp.	Femur.	Tibia.	Metatars.	First Phalanx.	
							Ant.	Post.
Maximum	20	22.7	16	25	22.7	18.9	5.71	5.40
Minimum	19.2	22.2	14.5	24.2	22.2	17.4	5.33	5.06
Mean	19.6	22.5	15	24.5	22.5	18	5.40	5.10

This table shows that the bones of the metacarpus and of the digit are the most variable in relation to length which is

[1] Recherches sur la mécanique animale du cheval. Recueil, 1877.

[2] M. Lemoigne measured the cartilage of prolongation.

maximum in the race-horse. The radius and the tibia are the least variable. The mean length of the long bones can be easily determined by dividing the height by the following figures:

5.1 Hum.	4.44 Radius.	6.66 Metac.	4.08 Femur.	4.44 Tibia.	5.55 Metat.	18.50 First Phal. Ant.	19.60 First Phal. Post.

Mean length of the bones in a series of horses with five centimetres difference in their height.

Height.	Humerus.	Radius.	Metacarpus.	Femur.	Tibia.	Metatarsus.
m.	m.	m.	m.	m.	m.	m.
1.20	0.235	0.270	0.180	0.294	0.270	0.216
1.25	0.245	0.281	0.187	0.306	0.281	0.225
1.30	0.255	0.292	0.195	0.318	0.292	0.234
1.35	0.264	0 304	0.203	0.330	0.304	0.243
1.40	0.274	0.315	0.210	0.343	0.315	0.252
1.45	0 284	0.326	0.217	0.355	0.326	0.261
1.50	0.294	0.337	0.225	0.367	0.337	0.270
1.55	0.303	0.349	0.232	0.380	0.349	0.279
1.60	0.313	0.360	0.240	0.392	0.360	0.288
1.65	0.323	0.371	0.247	0.404	0.371	0.297
1.70	0.33	0.382	0.255	0.416	0.382	0.306
1.75	0.343	0.394	0.262	0.428	0.394	0.315

The tibia is often a centimetre longer than the radius, but its spine, which projects between the articular condyles of the femur, is not considered. The combined length of the tarsus and the metatarsus, measured from the external tuberosity of the tibia, is quite constantly equal to that of the tibia.

It follows from this table that, having a single bone the height of the subject to which it belonged can be determined within two or three centimetres. The canon bones, on account of their variable relation compared with the height of a horse, are not reliable for this purpose. On the contrary, the humerus or the radius, the femur or the tibia, or still better a femur and a radius, in a word, two long bones other than those of the canon will enable us by ascertaining their mean length to determine the height quite accurately. Even in horses with the members disproportionate to the body, such as the thoroughbred horse, certain figures have given us quite uniform results.

	Humerus.	Radius.	Metacarp.	Femur.	Tibia.	Metatars.
	m.	m.	m.	m.	m.	m.
Thoroughbred horse, 1.60 m.	0.31	0.365	0.25	0.39	0.365	0.30
Common horse, 1.60 m.	0.313	0.360	0.240	0.392	0.360	0.288

The differences and modifications between a chunky draft-horse and one of a more slender conformation, like the thoroughbred for example, are due more to width, thickness and the perimeter of the body, than to differences in long bones of the members. As mentioned before, exception must also be made here of the canon and the phalanges.

B. Relations of the Lengths of the Long Bones in the same Member.

M. Cornevin has, without doubt, made the largest number of measurements upon the skeletons of the mammifera of all species and races. If he has not compared the measurements with the height in the living animal, he has, nevertheless, made numerous observations on the length of the different bones, and established certain modifications due to domestication; they can be consulted with great advantage in his *Traité de Zootechnie générale.* Unfortunately, he has taken the maximum of the length of the bones according to Broca's table, so that the figures which he obtained are not identical with those of others, even in solipeds of which he has measured the largest number.

The humero-radial index is susceptible to variation from .83 to .89 in horses of all heights; its mean is .86. The metacarpo-radial index varies from .65 to .70, and has a mean of 67; it attains its maximum in race horses.

The metacarpo humeral index has a mean of .78; it varies very little except in the hippodrome horse, in which it may reach .80. The tibio-femoral index is .94; it varies from .90 to 1. The mean of the metatarso-tibial index is .80; it may not be more that .77, or on the contrary, it may be .82 in the race horse. The mean metatarso-femoral index is .73; it varies from .69 to 77.

C. Relations of the Lengths of the Homologous Long Bones of the Anterior and Posterior Members.

These relations are quite constant, although there may be variations between the humerus and the femur, the radius and the tibia, the metacarpus and the metatarsus. The humero-femoral index only varies from .77 to .80; its mean is .785.

The radius and the tibia are often equal; if there be any difference, it seldom exceeds one centimetre, which is ordinarily in favor of the tibia.

The principal metacarpal bone is equal to five-sixths of the metatarsus.

The uniformity of the relations between the corresponding segments of the two members proves that the difference in the height of the animal at the withers and the croup is principally dependent upon the articular angles.

D. Proportions of the Scapulum and the Bones of the Pelvis.

1. Coxa.—The length of the coxa is a few centimetres less than four-fifths of the length of the head. With the height it varies relatively from .27 to .30; its mean is .285, that is two-sevenths of the height. It attains its maximum in thoroughbred horses. Its mean relation with the femur is as 1.17 is to 1; but it may vary from 1.28 to 1, to 1.11 to 1.

The length of the ilium is quite exactly two-thirds of that of the coxa; that of the ischium a little more than one-third (.37 to .40). The broken line uniting these two points is principally formed by the length of the ilium; the relation of the ischium to the ilium varies from .54 to .60; it has it maximum in race-horses whose coxa is especially elongated by the length of the ilium, as was remarked by Gobaux and Barrier. The separation of the cotyloid cavities, measured from their bottom, is approximately equal to three-eighths of the width of the haunches measured from one angle of the ilium to that of the other.

The bis-iliac diameter exceeds the intercotyloid space by two centimeters.

The sacro-pubic diameter almost equals the width of the forehead at the level of the supra-orbital arches. This relation is less variable than that with the height fixed at .143 by Saint-Cyr and Violet (*Traité d'obstetrique*).

The *lumbo-iliac angle*, indicated by the line of direction of the lumbar vertebræ, and by another line dropped from the lumbo-sacral articulation and tangent to the anterior border of the pubis, varies in different horses from 115° to 140°. This does not take into consideration the closing of this angle, the result of flexion of the spinal-column during the efforts of traction. By subtracting these figures from 180°, we obtain the true inclination of the ilium upon the horizon, which must not be confounded with its apparent direction. This inclination varies from 40° to 65°. As to the ilio-ischial angle, formed by the two lines extending from the bottom of the cotyloid cavity and tangent, to the extremity of the external angle of the ilium and the ischiatic tuberosity, we have known it to vary from 128° to 138°; its mean is 132° to 135°. Its variations are not without importance with regard to the mechanism of the croup, as Goubaux and Barrier have well pointed out.

2. Scapulum.—The scapulum in a fresh state, including its cartilage of prolongation, is very nearly equal to the length of the coxa; like the latter, it is subject to variation. The bony part itself is to the humerus as 1 : .86; but this relation may be as low as 1 : .79, or as high as 1 : .92. The scapulum is one of the most variable bones as regards length. Its development extends over a long period.

Proportions of the Skeleton of the Ass and the Mule.

The table below gives the principal measurements of the bones of the extremities of five asses and two mules:

	Height.	Scap.	Humerus.	Radius.	Metacarp.	Coxa.	Ilium.	Ischium.	Femur.	Tibia.	Metatars.
	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.
Ass	1.06	0.232	0.198	0.240	0.160	0.287	0.189	0.110	0.257	0.244	0.198
	1.08	0.228	0 198	0.243	0.165	0.296	0.182	0.116	0.252	0.251	0.198
	1.14	0.248	0.204	0.257	0.164	0.307	0.208	0.114	0.268	0.266	0.202
	1.32	0.280	0.245	0.298	0.202	0.340	0.216	0.128	0.317	0.3 5	0.243
	1.35	0.280	0.250	0.305	0.205	0.340	0.216	0.128	0.320	0.315	0.248
Mule	1.40	0.316	0.261	0.301	0.205	0.392	0.258	0.152	0.331	0.321	0.247
	1.40	0.316	0.255	0.306	0.200	0.390	0.258	0.152	0.326	0.325	0.250

By studying the reciprocal relations of these figures and comparing them with those of a horse, it is readily seen that

one of the differences between the ass and the horse is a distinct diminution in the length of the bones of the upper part of the extremities in the former. This can be seen by comparing the following table with that on page 440.

PROPORTIONS OF THE BONES OF THE ASS IN RELATION WITH THE HEIGHT. (HEIGHT = 100.)

	Humerus.	Radius.	Metacarp.	Coxa.	Femur.	Tibia.	Metatars.
Maximum	18.6	22.7	15.2	27.5	24.2	23.2	18.6
Minimum	17.8	22.2	14.8	25.5	23.3	22.8	17.7
Mean	18.4	22.5	15.0	26.9	23.5	23.0	18.2

The shoulder, arm, croup and thigh are always shorter than in the horse of the same height. The radius and the bones of the canon have nearly always the same proportion in the two species; nevertheless, these latter are much more variable in the asinine than in the equine species. Besides, in the latter, the tibia is sensibly longer.

Certain indices of length are equally different. The *humero-radial index* varies from .80 to .82, and in the horse from .83 to 89.

The *metacarpo-humeral index* ranges from .80 to .82, whilst its mean in the equine species is .78; it is only in thoroughbred horses that it reaches .80.

The *tibia-femoral index* is .95 in the ass, and .90 to 1 in the horse.

The *metatarso-femoral index* in the ass is not less than .77 to .78; in the horse, it varies from .89 to .77, the latter figure being found only in thoroughbred horses.

In the ass, the principal metatarsus and the humerus are within two or three millimetres of being of the same length, whilst in the horse the humerus is two, three and even four centimetres longer than the metatarsus; even in thoroughbred horses, where the latter bone attains its maximum length, there is a difference of a centimetre or more in favor of the humerus.

The skeletons of two mules, which were measured, had almost exactly the same proportions as that of the ass.

Variations in Height and Proportions of the Horse According to the Age.

We have thus far seen that there are scarcely any differences in the proportion of the skeleton of adults of both sexes. Let us study the modifications and the proportions which take place from birth to the adult period.

This question is almost new; the only literature upon this subject is that of the measurement of fœtuses or of new-born foals, given by Saint-Cyr and Violet in their Traité d'obstetrique, and the observation of M. Collin, related by M. Cornevin in his Zootechine générale, and in his Memoire upon "Growth" (*Journal de l'Ecole de Lyon*, August, 1892), in reference to a foal whose height at the withers, the length from the poll to the ischium, the circumference of the thorax and the distance from the sternum to the ground were measured monthly until it was a year old.

During the last two or three years we have measured the external or skeletal proportions of a dozen colts of different ages. Besides, M. Cornevin has kindly communicated to us his observations on the development of two colts during their first year. There are some differences of sufficient importance from which interesting conclusions can be formulated.

(*a.*) *Before birth.*—A fœtus, nine months old (abortion in an Anglo-Norman mare).

Length of the head	0.30	From the anterior part of the withers to the angle of the croup	0.33
Distance from the eye to the nostril	0.14	From the poll to the withers	0.31
Height at the withers	0.73	From the withers to the point of the shoulder	0.22
Length from the poll to the point of the buttock	0.80	From the point of the shoulder to the point of the elbow	0.16
Length from the point of the shoulder to the point of the buttock	0.60	From the point of the elbow to the supra-carpal bone	0.21
Vertical diameter of the chest	0.24	From the supra-carpal bone to the ground	0.28
Height of the girth	0.49	From the centre of the fetlock to the superior of the hoof	0.07
Circumference of the chest behind the withers	0.59	The length of the croup	0.19
The dorsal angle of the scapulum to the haunch	0.26	The length of the radius	0.18
From the stifle to the haunch	0.18	The length of the median metacarpal	0.17
From the stifle to the point of the buttock	0.18		

From the stifle to the point of the hock	0.265
From the point of the hock to the ground	0.38
Length of the humerus	0.12
The length of the femur	0.17
The length of the tibia	0.18
The length of the median metatarsal	0.22

(*b.*) *At birth.*—The height of the new-born foal exceeds one-half of the height of the adult (.55 to .60).

The table below gives the principal external dimensions of three new-born foals, the first being of small type, the second an Anglo-Norman, and the third of draft variety.

	No. 1.	No. 2.	No. 3.
	m.	m.	m.
The length of the head	0.29	0.34	0.37
Height at the withers	0.80	0.95	1.03
Length from the poll to the point of the buttock	0.80	0.95	1.02
Length from the point of the shoulder to the point of the buttock	0.65	0.75	0.80
Height of the chest	0.25	0.32	0.34
Distance from the girth to the ground	0.55	0.63	0.67
Circumference of the chest	0.65	0.81	0.86
Length of the croup	0.195	0.23	0.25
Width of the croup	0.16	0.18	0.20
Length of the shoulder from the withers to the point of the arm	0.18	0.21	0.225

These figures are very instructive; they show:

That the length of the head is a little more than one-half of that of the adult.

That it is contained about two and three-quarter times in the height, and two and one-fifth times in the length of the body (scapulo-ischial).

That the height is almost equal to the distance from the poll to the point of the buttock.

That the thoracic circumference equals or exceeds, only by a few centimetres, the scapulo-ischial length, and is from fifteen to twenty centimetres less than the height of the withers.

That the vertical diameter of the chest is only about one-half of the distance from the girth to the ground.

The shoulder is very short (only about one-third of its adult length).

That the croup is two or three centimetres longer than the shoulder, but is very narrow.

En résumé, that the superior regions of the members, the vertebral column and the chest show the least development, but develop most subsequently during the growth of the animal. The principal bones of the members of foals 1 and 2 of the preceding table measure :

	Scapulum less its Cartilage.	Humerus.	Radius.	Metacarp.	Coxa.	Ilium.	Ischium.	Femur.	Tibia.	Metatars.
	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.
No. 1.	0.139	0.140	0.190	0.190	0.183	0.11	0.74	0.18	0.179	0.23
No. 2.	0.175	0.176	0.220	0.218	0.222	0.132	0.90	0.218	0.222	0.255

These figures show very distinctly the proportions of the long bones ; the principal, metatarsus, is by far the longest bone. There is an approximate equality between the radius, the metacarpus, the coxa, the femur and the tibia, as well as between the scapulum and the humerus.

The pelvis is very narrow, the coxa being almost rectilinear and the ilium relatively short ; the ischio-ilial index is .67 to 69.

(*c.*) *Total growth.*—In order to judge of the total growth of a region or of a bone, it is necessary to measure them at birth, and later in the adult state in the same subject. The absence of investigations of these facts has led us to make some observations.

Our colt, No. 2, is the product of an Anglo-Norman mare and stallion (same variety) 1.60 m. in height. It is therefore fair to presume that it would have attained the form of its parents, and to establish a parallelism between its actual dimensions and those possessed by its ancestors its measurements are given in the following table :

	No. 1.	No. 2.	No. 3.
	m.	m.	m.
Length of the head	0.34	0.64	1.88
Height at the withers	0.95	1.60	1.68
From the poll to the point of a buttock	0.95	2.04	2.14
From the point of the shoulder to the point of the buttock	0.75	1.66	2.21
Vertical height of the chest	0.32	0.76	2.37
Distance from the girth to the ground	0.63	0.84	1.33
Thoracic circumference behind the withers	0.81	1.88	2.32
Length of the croup	0.23	0.56	2.43
Width of the croup	0.18	0.56	3.11
Length of the shoulder	0.21	0.66	3.14
Scapulum	0.175	0.37	2.11
Humerus	0.176	0.313	1.77
Radius	0.220	0.36	1.63
Principal metacarpal	0.218	0.24	1.10
First phalanx (anterior)	0.068	0.088	1.29
Coxa	0.222	0.47	2.11
Ilium	0.132	0.315	2.38
Ischium	0.90	0.174	1.93
Femur	0.218	0.392	1.79
Tibia	0.222	0.36	1.62
Principal metatarsal	0.255	0.288	1.12
First phalanx (posterior)	0.065	0.084	1.29

These figures explain themselves without explanatory details (see Fig. 1, at the end of the article).

(*d.*) *Progressive growth.*—Our observations upon this point are quite numerous; the following are the principal:

First Observation (by M. Cornevin).

Colt of draft variety, born April 16, 1888. Dam, 505 kilograms; sire, 506 kilograms:

Dates of Observation.	Live Weight.	Height.	Length from poll to point of buttock.	Circumference of chest.	Distance sternum to ground.
	k.[1]	m.	m.	m.	m.
1888, April 17	61	1.	0.97	0.88	0.62
April 29	61	1.10	1.11	1.88	0.67
May 13	96	1.10	1.11	1.88	0.67
May 16	96	1.14	1.19	1.06	0.69
June 3	131	1.17	1.21	1.12	0.69
July 6	131	1.21	1.30	1.29	0.695
August 6 (weaning)	182	1.21	1.30	1.29	0.695
1890, May 11	468	1.49	2.30	1.73	0.85

[1] 1 k. = 2 1-5 pounds (av.).

SECOND OBSERVATION (by M. Cornevin).

Filly born April 6, 1888; sire, Percheron, weighing 625 kilograms; dam, half-bred, weighing 650 kilograms:

DATES OF OBSERVATION.	Live Weight.	Height.	Length from poll to point of buttock.	Circumference of chest.	Distance sternum to ground.
	k.	m.	m.	m.	m.
1888, April 6	58	1.04	0.98	0.86	0.69
April 15	69.500	1.09	1.03	0.91	0.71
April 28	75	1.10	1.05	0.97	0.71
May 13	100	1.17	1.20	1.97	0.72
June 3	130	1.22	1.27	1.16	0.72
July 2	170	1.29	1.40	1.22	0.74
August 17 . . .	170	1.29	1.40	1.22	0.74
August 20 . . .	205	1.32	1.54	1.29	0.78
October 2	225	1.32	1.54	1.29	0.78
1889, January 6	300	1.45	1.69	1.40	0.85
April 14	320	1.45	1.92 (?)	1.46	0.89

THIRD OBSERVATION (M. Collin).

Colt, born April 15, 1888. (The measurements having been made with a string, some of the dimensions are not quite accurate.)

DATES OF OBSERVATION.	Live Weight.	Height.	Length from poll to point of buttock.	Circumference of chest.	Distance sternum to ground.
	k.	m.	m.	m.	m.
1888, April 15	55	1.03	1.02	0.86	0.67
April 29	90	1.09	1.10	1.86	0.69
May 13	100	1.17	1.22	1.07	0.73
June 3	130	1.26	1.28	1.15	0.73
July 2	175	1.30	1.48	1.27	0.74
Aug. 19 (weaning)	220	1.36	1.55	1.37	0.77
October 2	245	1.42	1.66	1.43	0.82
December 19 . .	275	1.48	1.74	1.48	0.86
1889, April 14	340	1.58	1.79	1.58	0.88
September 1 . . .	403	1.62	1.81	1.63	0.88
1890, May	505	1.67	2.15	1.80	0.89

Regions Measured.			
	m.	m.	m.
Length of the head	0.51	0.57	0.56
Height at the withers	1.30	1.45	1.48
Scapulo-ischial length	1.15	1.42	1.48
Thoracic circumference	1.34	1.60	1.58
Height of the chest	0.52	0.665	0.645
Distance from the girth to the ground	0.78	0.785	0.835
Length of the shoulder	0.46	0.58	0.55
From the point of the arm to the point of the elbow	0.31	0.335	0.36
From the point of the elbow to the supracarpal bone	0.41	0.48	0.49
From the supracarpal bone to the ground	0.445	0.42	0.46
From the supracarpal bone to the ergot	0.30	0.28	0.295
From the dorsal angle of the scapulum to the external angle of the ilium	0.55	0.655	0.61
Length of the croup	0.40	0.47	0.465
Width of the croup	0.34	0.47	0.465
From the patella to the haunch	0.38	0.44	0.47
From the patella to the point of the buttock	0.38	0.44	0.47
From the patella to the centre of the tibio-astragaloid articulation	0.47	0.44	0.50
From the patella to the point of the hock	0.47	0.48	0.51
From the tibio-astragaloid centre to the ground	0.51	0.48	0.52
From the point of the hock to the ergot	0.425	0.395	0.43
From the jaw (angle) to the forehead	0.25	0.395	0.43
From the nostril to the eye	0.225	0.395	0.43
Superior border of the neck	0.57	0.75	0.43
Inferior border of the neck	0.42	0.46	0.54

Note.—In the subject of the fifth observation, the canons were excessively short.

According to M. Cornevin, the figures indicative of the mean progressive development during the first year are given in the following table :

		Weight.	Height at withers.	Length from ischium to the poll.	Thoracic circum-ference.	Sternum to ground.
		k.	m.	m.	m.	m.
Suckling period.	First month	41.000	0.14	0.21	0.17	0.04
	Second month	31.600	0.07	0.10	0.14	not meas'd
	Third month	42.600	0.04	0.15	0.10	0.01
	Fourth month	24 600	0.03	0.08	0.06	0.025
		per mo.	per mo.	per mo.	per mo.	per mo.
Fifth and sixth months		18.500	0.03	0.06	0.03	0.02
Seventh and eighth mos.		12.500	0.03	0.03	0.025	0.02
Ninth, tenth, eleventh and twelfth months		18.500	0.025	0.05	0.025	0.01

These ratios of growth have the disadvantage of being valued in absolute quantities, and of not being applicable to all heights.

Below we give some mean figures which show quite well the increase in the height, the thoracic circumference and the length of the animal. (Fig. 2.) The height at the withers is :

At birth	0.55, 0.60	of the	adult height.
One to two months	0.70	"	"
Three to four months	0.80	"	"
Six to seven months	0.85	"	"
One year	0.90	"	"
Two years	0.95	"	"
Three years	0.98	"	"
Four years	0.99	"	"
Five years	adult	"	"

The thoracic circumference behind the withers is :

At birth	0.45	of the	adult circumference.
Three months	$\frac{2}{3}$	"	"
Six months	$\frac{3}{4}$	"	"
Twelve to fifteen months	$\frac{4}{5}$	"	"
Two years	$\frac{7}{8}$	"	"
Three years	$\frac{95}{100}$	"	"
Four years	$\frac{98}{100}$	"	"
Five years	adult	"	"

The length of the body from the point of the shoulder to the point of the buttock develops successively in almost the same proportions as the circumference of the chest. It is :

At birth	0.45	of the	adult length.
Three months	$\frac{2}{3}$	"	"
Six to seven months	$\frac{3}{4}$	"	"
One year	$\frac{4}{5}$	"	"
Two years	$\frac{9}{10}$	"	"
Three years	$\frac{95}{100}$	"	"
Four years	$\frac{98}{100}$	"	"
Five years	adult	"	"

The distance from the girth to the ground at birth is three-fourths of the same distance in the adult. During the first month it increases three to five centimetres. During the second and third months it remains almost stationary, but gradually increases from one and one-half to two, and even three centimetres per month. During the fourth, fifth and sixth months, about one centimetre monthly until the end of the first year. During the second year this distance augments two to four centimetres and now attains its maximum. It varies little during the third year, and finally diminishes slightly during the fourth and even the fifth years.

There is some relation between the development of the thorax and the anterior member. In the young, the members show the greatest development; the distance from the girth to the ground increases; later there is an equilibrium, the chest descending as rapidly as the members become elongated and the girth remaining at the same height from the ground. Still later the chest develops more than the member, and the sternum is lowered toward the ground. The length of the body and the circumference of the thorax are the last to attain their full development during the animal's growth. The preceding data represent the progressive development of an anglo-norman colt, .95 metres in height at birth and 1.60 metres at the adult period.

Age.	Height at withers.	Length of body.	Circumference of thorax.	Height of chest.	Distance from sternum to ground.
	m.	m.	m.	m.	m.
At birth	0.95	0.75	0.81	0.32	0.63
One month	1.08	0.90	1	0.40	0.68
Two months	1.16	1.90	1.12	0.475	0.685
Three months	1.24	1.08	1.25	0.54	0.70
Four months	1.30	1.14	1.30	0.57	0.73
Six months	1.36	1.20	1.35	0.59	0.77
Eight months	1.40	1.26	1.40	0.61	0.79
One year	1.45	1.33	1.50	0.63	0.82
Two years	1.52	1.50	1.64	0.67	0.85
Three years	1.57	1.58	1.78	0.71	0.86
Four years	1.585	1.63	1.84	0.74	0.845
Five years	1.60	1.66	1.88	0.76	0.84

It can be seen by these figures:

That the scapulo-ischial length, at first much less than the height, equals the latter at three years and generally exceeds it afterward.

That the circumference of the chest, smaller than the height at birth, equals the height at four to five months and gradually exceeds it after eight to ten months.

That the height of the chest at first one-half of the distance from the girth to the ground, will afterward equal or even exceed this distance.

The rhythm of growth is subject to frequent and numerous modifications. It is well known that it is considerably influenced by the alimentation and the state of health, and that it

differs according to the individuals, all things being otherwise equal. M. Cornevin in his remarkable Memoire upon "Growth," has indicated in the ox variations which are due to the influence of the sex, the race, the season, or to some special physiological conditions. For example, the growth is more active in January, May, June and August, and less so in February, March, September, October and November. The period of the development of the teeth coincides with the periods of increased growth.

The same influences, for instance, are, without any doubt, observed in the equine species, but they have not been positively proved. Veterinarians in breeding districts would here find an interesting field for study.

Period of the Coössification of the Epiphyses of the Bones.

The coössification of the bony epiphyses, according to the observation of the H. Toussaint[1], and those of the author are given in the following table:

			H. TOUSSAINT.	F. X. L.
Anterior member.	Humerus	Superior extremity	3 to 3½ years.	Toward 3½ years.
		Inferior extremity	15 to 18 months	15 to 20 months.
	Radius	Superior extremity	15 to 18 months	15 to 18 months.
		Inferior extremity	. . . . .	Toward 3½ years.
	Cubetus	Summit of the Olecranon	. . . . .	Toward 3½ years.
	Median metacarpal	Inferior extremity	15 to 18 months	15 to 18 months.
	First phalanx (anterior)	Superior extremity	15 to 18 months	15 to 18 months.
	Second phalanx (anterior)	Superior extremity	12 to 15 months	. . . . .
Posterior member.	Coxa[2]	Iliac crest and external angle	Toward 5 years	4½ to 5 years.
		Ischiatic tuberosity	. . . . .	. . . . .
	Femur	Superior extremity	3 to 3½ years	Toward 3¼ years.
		Inferior exiremity	3 to 3½ years	Toward 3½ years.
	Tibia	Superior extremity	3 to 3½ years[3]	Toward 3½ years.
		Inferior extremity	20 to 24 months[4]	Toward 2 years.
	Calcaneous	Summit	. . . . .	3¾ years.
	Median metatarsal	Inferior extremity	15 to 18 months (after the metacarpal)	. . . . .
	First and second phalanges (posterior)		Same time as the anterior	. . . . .
	Vertebral bodies	Head		
		Glenoid cavity	Toward 5 years	4½ to 5 years.
	Spinous processes of the withers	Summit	. . . . .	4½ to 5 years.

[1] See Traité d'anatomie Comparée, by M. Chauveau and Arloing.

[2] The three pieces constituting the coxa (ilium, pubis, ischium), as well as the coracoid nucleus of the scapulum coössify shortly after birth, but the exact period has not been determined.

[3] The special nucleus of the anterior tuberosity of the tibia coössifies several months later than the other articular tuberosities.

[4] The external malleolar nucleus of the peroneus coössifies at from two and one-half to three years.

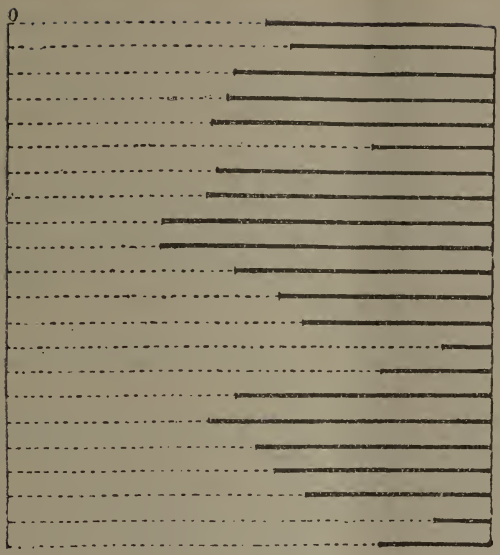

Figure 1.

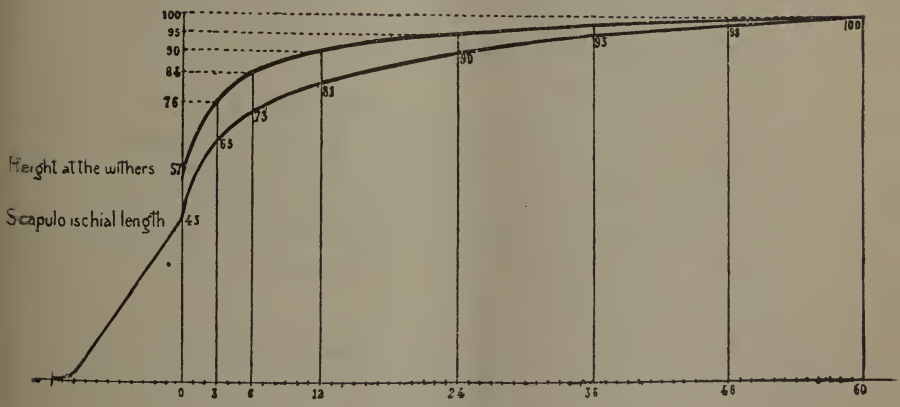

Figure 2.

Diagrams of Growth or Development.

Figure No. 1 expresses by the dotted lines the different dimensions at birth, and by the continuous lines the increase of these same dimensions until the animal is an adult. The proportions consequently vary according to the inequality of this increase.

Figure No. 2 gives the curve of increase in the height of the body at the withers from birth (upper line), and also the curve of increase in the length of the body from the commencement of gestation (lower line left and right from zero). The vertical lines indicate the time, month by month, from birth until five years of age, from zero to the right.

The vertical scale expresses the degree of growth from zero to 100.

It can be seen that during the first two months of gestation the animal develops very little. This is the time of its blastodermic formation (epigenesis); it then develops rapidly and almost uniformly, indicated by the almost straight line to the right, until birth; then there is a slight inflexion of the line (a singular point) indicative of a super-activity of growth during the first months of extra-uterine life. This extreme growth immediately diminishes more and more until it ceases at the end of the fifth year, when the growth is completed. The vital energy follows for more or less time a straight line, terminating finally parallel with the line marked zero; then it suddenly decreases with great rapidity to meet the line indicating the height.

It is not without interest to note that most of the natural phenomena can likewise be expressed by a curve, complete or incomplete, resembling an ellipse or a parabola; for example, the physical state of the body, geological changes on the earth's surface, the movements of the planets, etc. A mathematician would perhaps be able to formulate a law of the evolution of the physical forces.

With the exception of the coxa and the scapulum, whose growth may continue until the age of four and one-half or five years, it may be said that the growth of the bones of the members is completed at about three and one-half years, and that the subsequent increase of some centimetres in the height is due principally to the development at the withers. The vertebral column and the ribs continue to develop until five years.

It may be concluded from the two preceding observers that in well-bred and precocious horses, the coössification of the bony centres may take place about six months earlier than in common horses. According to the observation of both, the ossification of the long bones of the members were coössified at three years or a short time after that period. The coössification of the vertebræ appears to take place at four years. Might it not be due to this early development that the thoroughbred horse owes the proportions of his members, resembling somewhat those of the young animal.

ABSTRACTS.

INOCULATION OF GLANDERS.

The results of inoculating glanderous material into the skin and of introducing it into the natural air passages are well known. Infection through the digestive tract is not so well known to us on account of the effect of the gastro-intestinal secretions.

Nocard injected a mule several times with mallein without any results, showing that the animal was in a healthy state. A carrot, in the centre of which was placed a culture of glanders bacilli grown upon a piece of potato, was fed to the animal.

Fifteen days afterward an injection of mallein, accompanied by a local reaction, raised the temperature 2.6° C. The animal was destroyed some days afterward and showed the lesions of glanders in the lungs.—*Soc. Cen. de Méd. Vét. Rev. Vét.*

STATISTICS RELATIVE TO THE FREQUENCY OF TUBERCULOSIS IN THE ABATTOIR.

In our American abattoirs we have few or no accurate data to show the exact percentage of tuberculosis among animals slaughtered and placed upon the market for consumption. Attempts have been made in foreign countries to ascertain the prevalence of the disease among slaughtered animals, and below is a table (Van der Sluijs, *Tidjsch. voor Veeartsenijk.*, Vol. 3, 1894), which represents such percentage in the abattoir in Amsterdam during the last six years:

Years.	Adult animals slaughtered.	Tuberculous.	Per cent per 100.
1888	28,061	495	1.76
1889	26,225	793	3.5
1890	22,813	755	3.3
1891	23,392	1,248	5.3
1892	25,454	1,332	5.3
1893	28,342	1,491	5.26

—*Revue Vétér.*

MUSCULAR RHEUMATISM IN THE HORSE.

M. Chobaut, after carefully observing three cases of muscular rheumatism in the horse, arrived at the following conclusions:

1. That salicylate of sodium gives only ordinary results in the treatment of muscular rheumatism.

2. That the most rational treatment of this disease consists in applying friction with blistering liniments over the painful areas; in the internal administration of sulphate and bicarbonate of sodium, cream of tartar and nitrate of sodium.

The patient should be allowed to run in the field or under good sanitary conditions in the stable.

M. Caroni has made two observations of muscular rheumatism in the horse, in which he has had rapid recovery of the patients by the administration of sulphate of quinine in daily doses of two to four grammes for four or five days. He thinks that Chobaut's treatment might be supplemented and improved by the addition of such a daily quantity of sulphate of quinine. —*Répertoire de police sanitaire Vétérinaire*, May, 1893.

LUMPY JAW (ACTINOMYCOSIS) IN DOMESTIC CATTLE.

To-day the opinion of a few Health Officers who judged the disease to be infectious from the analogy of other similar diseases known to be so, is winning support, because it is experimentally proved that the "little grains of sand," "the ray fungus," as they are called, is the degenerate representative of the true microbe, which is a microbe and capable of distribution in lymph, and probably in blood, as others of its class are. It is now known that it has been mistaken for tuberculosis in lungs and glands, and that, in the same animal, it may have a wide distribution. It is apparently a slow infection, as *e. g.* is leprosy in man, but it is frequent enough to justify a sanitary verdict of "guilty until proved innocent," both as respects flesh and milk.

The following opinion by a recognized veterinary authority was kindly given to the secretary at his request, and will go far to settle the practical question of the duty of Boards of Health in the matter. The professor leaves some questions unanswered,

because as yet the answer is not known, but he puts our present knowledge into practical form as only a practical scientific man can:

ITHACA, N. Y., May 8, 1894.

Dear Sir:—In the last few years the demonstration that many cases of this disease are curable by the internal administration of iodide of potassium renders it a less grave matter than it was previously, when we could only destroy the local tumors by the direct application of preparations of iodine. Now, in man and beast alike, there is good hope of securing by the iodide medication the arrest and destruction of the growth wherever it may be situated, internally or externally.

But this curability does not alter the fact of the communicability of the germ from one animal to another. The extraordinary assertion that as grown on or in one animal body it is incapable of inoculation on another animal, but that it must come from the vegetable kingdom, was always unreasonable and has been sufficiently disproved by the results obtained by Wolff, Israel, Maksatow, Belske, Mayo and a number of others. That the disease is not readily conveyed from animal to animal must be allowed, but neither is it readily conveyed from vegetable to animal.

The danger to man is incomparably less than it is in cases of tuberculosis, to say nothing of the more virulent diseases, but that there is a real danger cannot be ignored. The presence of the actinomyces in internal organs like the brain, liver, etc., which have no connection with the exterior, shows that its germs are conveyed by the blood and may, therefore, appear in any organ or tissue not excepting the udder.

But, again, the preservation of the actinomycotic animal is equivalent to the culture and multiplication of the germ, so that it tends thereby to become more prevalent and widely diffused in the vegetable kingdom on which the animals feed. If, therefore, the disease is sought to be suppressed or prevented at all, one of the most important measures must be its eradication from the bodies of the lower animals. Energetic measures, including the killing of actinomycotic animals, are therefore fully warranted; or, in view of the slow propagation of the disease, and its amenability to treatment, the afflicted animals may be secluded and subjected to a course of potassium iodide. In such a case, only those that resist this agent and persist in spite of it would be killed.

Very respectfully,

JAMES LAW.

Public Health, Vol. X, Nos. 1 and 2.

DR. HEWITT, St. Paul.

THERAPEUTIC NOTES.

MORPHIA IN THE SOLIPEDS.

The numerous experiments made by M. Guinard in the physiological laboratory of Veterinary School at Lyons confirm in all respects the results of the physiological action of morphine upon the solipeds as observed by veterinary practitioners. True morphine narcosis is seen neither in the horse nor the ass, whatever may be the doses of the alkaloid injected; be it intravenous or subcutaneous. In these animals the drug acts as an excitant rather than a narcotic. It produces a certain amount of nervous depression and in some cases will diminish sensibility; but this action is rather the depression or coma which succeeds a period of over-stimulation. The physiological effects of morphine vary not only in the different species, but in individuals of the same species. Very large doses produce symptoms of vertigo of extreme violence and gravity, and may terminate in death. Albrecht, Schilling, Friedberger, Fröhner, Weber, Cagny, Brun, Gesell and many other practitioners have already proved the exciting narcotic effects of morphia in solipeds. Recently the Central Society of veterinary medicine in Paris has discussed this question and has very conclusively confirmed the above opinion. —*Journal de Médecine Vétérinaire et de Zootechnie.*

EXTERNAL APPLICATION OF SALICYLIC ACID.

Dr. Bourget (*Therapeutische Monatshefte*, November, 1893), speaks very favorably of the absorption of salicylic acid through the skin in the treatment of acute rheumatism of the joints. He anointed the diseased joint with a ten per cent ointment of the acid and covered it with a flannel bandage. He found that no internal treatment was necessary; the pain in the joint was relieved with great rapidity, the swelling rapidly diminished and the fever also abated. He favors in addition the internal

administration of the drug so as to prevent a relapse of the disease which may occur. He comes to the following conclusions:

1. Salicylic acid is quickly absorbed through the skin. The skin of young persons is much more capable of absorption than that of older ones, and the skin of blondes is more readily penetrated than that of individuals with black hair or dark skin.

2. The rapidity and strength of this skin absorption depend upon the vehicle with which the salicylic acid is used. Only when fatty substances are used can the skin absorb it readily; when vaseline or glycerine is used the absorption either does not take place or is very slight.

3. The treatment of acute joint rheumatism with a salve prepared from salicylic acid and turpentine is very much to be commended.

4. This salve is less efficient in other forms of rheumatism, but may serve as an aid to massage in treating them.

5. In cases of gonorrhœal rheumatism it has no effect.—*Therapeutic Gazette.*

GUAIACOL.

By Simon J. J. Harger, V. M. D.

Synonym.—Methylpyrocatechin. $C_2H_4OHOCH_3$. Chemically-pure guaiacol is a slightly colored liquid obtained after a complicated process by the fractional distillation of beechwood-tar creosote. It has an agreeable, smoky odor, a specific gravity of 1133 and boils at 206° to 207° C. It is soluble in water in the proportion of one to eighty-five, and readily so in alcohol and ether. It also constitutes from sixty to ninety per cent of creosote. One-half to three drams may be injected subcutaneously in the horse and two to ten minims in the dog in a pure state or in a twenty to thirty per cent solution of almond oil.

Guaiacol, one of the list of numerous preparations which have lately been discovered by chemists, has recently been brought to the notice of the medical profession. It is a drug which has been employed very little in veterinary medicine,

although it may prove to be of value to the veterinarian, and I will take the liberty to call the attention of the profession to the drug that they may give it a fair trial.

It was primarily intended to supplant the use of creosote as an antiseptic, expectorant and stimulant of the mucous membranes in pulmonary diseases. It has been used for other therapeutic purposes; among these, and the one to which I more especially refer in this article, is its action as an antipyretic. It has been used in cases of acute tonsillitis. Its local application here is accompanied by a certain amount of irritation. In the course of a few days the inflammatory pain subsides, the swelling diminishes and the patient is able to swallow. Dr. J. M. DaCosta, in a clinical lecture, speaks conservatively though favorably of guaiacol as an antipyretic in man. The drug was used externally upon the skin of the thigh, abdomen, chest and groin by rubbing or by painting it on with a camel's-hair brush and then covering it with an impermeable dressing in order to prevent evaporation. He found that twenty-five to fifty minims of guaiacol would rapidly reduce the temperature in malarial and typhoid fever and pneumonia, even as much as seven degrees in the course of an hour or two; also that this diminution of the temperature was not accompanied by any decided disturbance of the nervous system such as symptoms of collapse or profuse sweating. The drug does not seem to affect a permanent reduction in the temperature and its application can be repeated with safety during twenty-four hours as often as may be necessary in order to control the pyrexia. He also suggests that in many instances in which the cold bath cannot, for any reason, be employed in reducing the high temperature, this drug may be administered as a substitute.—*Therapeutic Gazette.*

This drug may be especially pertinent to veterinary medicine, more particularly in the larger animals, because the application of the cold bath is not always practicable and, in fact, sometimes impossible.

Guaiacol is absorbed through the skin when applied locally and thus enters the general circulation. Linossier and Lannois have proved that this absorption takes place through the skin and not through the respiratory apparatus by making their patient breathe through a tube connected with the air outside of the room in which he remained. The physiological effects

were of the same intensity as if this precaution had not been taken. The drug is eliminated by the kidneys, which can be demonstrated at the end of a quarter of an hour; 55.5 per cent or about one-half of the quantity applied to the skin was found to have been eliminated through the urinary excretion. The question is: How does this drug act in reducing the bodily temperature? This has been studied by Guinard and Stourve ("Biologie," 1894). These investigators claim that the general reduction in the temperature which follows its application is not the result of the absorption of the drug through the skin. They have applied the remedy in many cases, and from experiments made upon man and the lower animals by means of careful vivisections have demonstrated that guaiacol acts upon the thermogenic centres by excitation of the peripheral nerve terminations. Bard, on the other hand, claims that it acts by its being absorbed through the skin; this point is still somewhat in doubt.

Have we any use for this drug in veterinary medicine? So many medicinal agents of supposed value are isolated by the chemists, placed upon the market and found not to possess the virtues claimed for them, that numerous experiments are required before thoroughly proving their efficacy. My knowledge of guaiacol is too limited to speak *pro* or *con* as to its qualities, but it would seem from the few clinical experiments that have been made upon man and animals that it may possess some qualities which may give it a recommendation to be placed on the veterinary list. It would seem that this drug would be of value in cases of pyrexia, in which the temperature is elevated to such a degree that it may threaten the life of the animal. The human physician in such cases, all other conditions not being unfavorable, resorts to the ice-pack. In our practice this mode of treatment is applicable in the smaller animals, but not in the larger ones which form the bulk of our practice. We have a few powerful and effective drugs, but their action is slow and uncertain, and if given in such diseases as to produce a positive and immediate effect, they are often contra-indicated by their other physiological properties.

One particular condition in which this drug may be of value is thermic fever or sunstroke, which is so common in summer

time in large cities. In these cases the animal is very often beyond recovery before the medicaments have time to combat the fever.

Below I state three cases with febrile symptoms in which I have used guaiacol.

Case I.—Setter dog, suffering from traumatic peritonitis. April 20, morning temperature 106° F., 12.30 p. m. temperature 105.2° F. Painted one dram of guaiacol over the abdomen and covered with flannel and cotton; 2.30 p. m. temperature 102.8°, 4.30 temperature 102.6°, a reduction of about 2½ degrees in two hours. April 21, 9.45 a. m. temperature 100.8°; 3 p. m. temperature 104.2°. The administration of the drug in this case seems to have successfully combated the temperature in twenty-four hours.

Case II.—Sorrel gelding, suffering from thermic fever; 3 p. m. temperature 108.4°, respiration 68, pulse imperceptible; 3.30 p. m. temperature 107°, 4.30 p. m. 105°. Applied one ounce of guaiacol on the inside of the thigh; in twenty minutes the horse had a chill; 5.15 p. m. temperature 103½°, 7 p. m. 101°.

Case III.—Red setter dog. Diagnosis, distemper. June 16, 10 a. m. temperature 105 3-5°. Applied thirty minims of guaiacol to the abdomen; 10.30 a. m. temperature 104°, 11 a. m. temperature 104°. Applied thirty minims of guaiacol to abdomen; 11.30 a. m. temperature 103°, 2 p. m. temperature 101 3-5°. The temperature was reduced four degrees in four hours.

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THE
VETERINARY MAGAZINE.

VOL. I. JULY, 1894. No. 7.

SANITARY CONDITION OF DAIRY FARMS.

BY JOHN M. PARKER.

[Read before the Massachusetts Veterinary Association.]

In a paper read before the American Medical Association in 1891 on "The Treatment of Chronic Pulmonary Consumption," the essayist remarks that "Our surroundings make us what we are. If our treatment could begin with the birth of the patient, in ninety-nine per cent of cases, we should have no tuberculosis to treat. *No matter about the family history.*" This remark applies equally well to the dairy cow. *Their surroundings make them what they are.* And I venture to assert that, if the sanitary and hygienic conditions were what they should be, we would have little or no bovine tuberculosis in our dairy herds. It is the common every-day life a person leads that governs his health; and it is the common every-day life the dairy cow leads that governs her health and vitality. *Their surroundings make them what they are.*

Sanitary science has made vast strides in the last twenty years, yet our dairy farms are in practically the same condition they were in fifty or one hundred years ago. In fact, no effort is made on the average farm to conform to any sanitary laws or regulations whatsoever. The old barbarous practice of confining the cattle in stanchions is still in use; and the old barn and barnyard with its strong odor and slimy filth are still in existence.

Sanitary science is advancing every year. Our cities are well drained; our drinking water is carefully guarded; houses and schools must have sufficient light and air; our young men

and children must have exercise; but yet our dairy cattle are expected to retain their health and strength and to maintain their vitality, shut up for months in close barns, without ventilation or fresh air, and with little light; compelled to stand in their tracks unable to move; unable to turn round, even to lick their sides.

It seems strange that the *entire* question of the sanitary improvement of our dairy farms should have escaped notice as it has. It is not a new subject. For many years past, authorities have agreed that the principal predisposing causes of tuberculosis are poor sanitary and hygienic conditions, and yet notwithstanding the universal prominence given to sanitary conditions as predisposing causes, they are almost entirely ignored among the prophylactic measures suggested by many of these same authorities.

As showing that sanitary conditions are not observed as they should be on dairy farms, I have attempted to tabulate the conditions as found on twelve farms in this vicinity. These are not picked out, but are taken at random from farms visited from day to day. The table shows roughly the amount of cubic space per cow; the ventilation, light, water supply; whether there is a cellar, with its condition, and how the manure is disposed of.

No.	No. of Cattle.	Cubic Space for Animal.	Ventilation.	Light.	Water.	Cellar.	Manure. How Disposed of.
1	7	465	none	poor	city	yes	cellar
2	10	286	"	"	spring	no	outside barn
3	1	440	"	none	city	"	"
4	6	224	"	poor	spring	"	"
5	4	143	"	"	"	"	"
6	7	800	stairway	fair	"	yes	cellar
7	7	416	none	good	well	"	"
8	12	487	"	"	"	"	"
9	19	1165	good	fair	"	"	"
10	3	266	poor	poor	"	"	"
11	3	1336	none	good	puddle	"	"
12	12	233	"	"	spring	"	"

You will notice, as a rule, the cattle are far too crowded. In the city of Boston each animal must have 1000 cubic feet of space, and probably with good ventilation that may be sufficient; at any rate it is an immense improvement on many farms in other

parts of the State; but even 1000 cubic feet are altogether inadequate if there is no ventilation. What must be the condition of the barns then, when, as in No. 5, there is only 143¼ cubic feet for each animal, with no ventilation. In only three farms out of the twelve, you will notice, is there any attempt at ventilation, and even in these it is more in name than fact. And in not a single barn that I have been in is there any provision made for the admission of fresh air.

Of the twelve barns visited four had good light, two had only fair light, five had very poor light, and one had no light at all.

As a rule New England farms have good water, but on some farms the wells are situated too near the yard and receive the surface drainage, and in some instances the cattle are even watered in creeks and puddles formed by the surface water.

Keeping the manure in the cellar is another common practice. In eight of these twelve barns, the manure is kept in this way. At the farm referred to as No. 8, there are twelve cows, each cow with 487 cubic feet of space. This barn is well lighted; the windows facing the south, but there is no ventilation whatever, except when the door is open. This farmer makes a special boast that his cattle are not out of the barn from fall till spring. They are watered in the barn, and the manure is dropped into the cellar below, where it is allowed to remain till removed in the spring. In making a visit to this barn during the winter, a man who was with me had to leave the barn because of the foulness of the air.

At another farm, Nos. 2 and 4, there are two barns. In one containing ten cattle, each animal has 286 cubic feet with no ventilation and only one small window for light. The other barn has six cattle, each animal having 224 cubic feet. This one also is without ventilation or sufficient light. In these barns the air was very bad.

At No. 5 there is no ventilation and only one small window for light in this barn; each animal had only 143¼ cubic feet. Two out of four animals were evidently tuberculous.

At No. 10 three cows are kept in a tightly boarded pen, 10 x 10 x 8, giving about 266 cubic feet to each animal. At this barn there is a small ventilation and one small window, but in winter when everything is tightly closed, the atmosphere is fearful.

The other day I visited a barn, No. 11, and in conversation with the owner, I asked him where he watered his stock. "In a puddle outside," he answered. The puddle was a marshy place where the water lodged in wet weather. It was situated about twenty yards from the barn and formed part of the yard. The manure pile was on sloping ground at the side and drained into the puddle.

At No. 12 there are twelve cows, each having 233 cubic feet, with no ventilation whatever, the farmer taking special pains to have a heavy canvas curtain in front of the cows. This is a fearful hole in winter time, and it has the reputation of being the hottest barn in the district. This farmer is said to lose three or four cows every year.

No. 3 is a small shanty in the city with neither window nor ventilation. The water is carried to the cow, and she is in the barn winter and summer. Inside the barn is terribly filthy.

At another farm (the State Experimental Station of a neighboring State) the barn is so hot and close in winter that a friend of mine who was visiting there had to leave and go into the open air because the hot, foul air in the barn made him sick and inclined to vomit.

These, gentlemen, are common examples of the average New England farm. Farmers have been taught to do those very things that are injurious to their stock. They have been taught to keep the manure in the cellar. What is the result? You have a damp, chilly atmosphere full of foul odors and organic impurities. They have been taught to keep the barn close and warm, and the only heat it gets is from the animal body. The hotter, they think, the better it is.

In the great majority of dairy farms there is not even a pretence of ventilation, while the cattle are packed in as close as they can conveniently be put. A cow has about four or five times the lung capacity of a man, yet in many of the farms each cow has only a tithe of the space required by a child under seven years of age and that without any ventilation.

Fresh outside air contains only a trace of CO_2, about four parts in 10,000. The air of a room would be fairly good with eight or nine parts in 10,000, yet some barns have as much as fifty or sixty parts of CO_2 in 10,000, and, I have no doubt, if the percentage were taken during cold weather in winter when the barns are tightly shut up, the air would be very much worse.

When only a small quantity of CO_2 is contained in the air, the CO_2 in the lungs is very readily diffused through the atmosphere; but when that atmosphere has become impure, when it contains a large amount of CO_2 with organic impurities, then the CO_2 in the lungs is not so readily diffused through the air; it has found its level and is retained in the system where it lowers the vitality, causing the dullness and lethargy experienced by any one after sleeping all night in a close room.

In calculating the amount of impurity in the atmosphere of a barn the CO_2 is taken as the standard of impurity only because so far no simple means has been discovered by which the other impurities can be determined, so that the amount of CO_2 shows only relatively the amount of impurity in the air.

When a ray of light penetrates a dark room, innumerable particles are seen floating in the air; these particles of so-called dust are organic matters given off by the occupants of the barn as well as fungi, bacteria, dried manure and particles of hay and grasses. It is this dust that is so dangerous as a source of infection in tuberculosis. The manure, as pointed out by Billings, contains the bacilli; when dry it becomes pulverized and powdery and along with the discharges from the nose, it mixes with the dust and chaff and the other impurities in the air which are breathed by the cattle. Ventilation which should rid the atmosphere in the barn of these impurities being altogether lacking.

Drainage and dark and damp cellars under the barns have a close relationship to the ventilation and warmth of the barn. The wet and filth usually found in the cellar, keep the air of the barn damp and chilly; while the decomposing animal and vegetable matters give off a quantity of CO_2 which contributes largely to swell the amount already in the barn.

The cellar is considered by many farmers to be a necessity. There the manure is kept; there odd tools and implements are stored; and if the barn upstairs gets too crowded, one or more animals will be turned into the cellar. It is always dark and damp; the sunlight never penetrates there; the manure is thrown down, the liquid portion runs along and soaks into the ground; in many cases it is a little lower than the yard, and more or less of the surface water flows into it. It is never drained; usually it is damp and wet all summer; the ground

only dries by evaporation ; and according to Professor Kedzie, "To evaporate one pound of water consumes enough heat to raise the temperature of five and one-half pounds of water from freezing to boiling point ;" or to vary the illustration "suppose that a tile drain discharges constantly for one day a stream of water whose cross section is one square inch, and velocity two and one-half miles an hour, *this one day's drainage would save the heat equivalent to nearly six tons of coal.*"

Further, we must remember that barns are usually warm ; this warmth causes a current of air upwards, so that this damp, chilly air is drawn up into the barn above, where it does the most harm.

In referring to this condition, Professor Kedzie forcibly remarks, "*The evaporation* of so much water renders the air over such a soil damp and chilly. This result is a physical necessity. This damp and chilly atmosphere has a more serious result than the simple feeling of discomfort. It has a most depressing influence on the human system, lowering its tone, enfeebling the vital powers, and acting as the predisposing cause of a long list of diseases, some of them the most destructive and incurable known to the medical profession. The depressing influence of the dampness and chilliness of a water soaked soil is not to be compared to the effect of an occasional wetting as when we are caught in a shower, the chilly dampness of the undrained soil is persistent and unremitting, dragging us down with its cold fingers at all hours, at 'noon of day, and noon of night,' as if we toiled and rested, waked and slept in a perpetual drizzle of cold rain. It may seem a small force at first, but its persistent, untiring and relentless pull tells upon the strongest at last like the invisible fingers of gravity which finally drag down all to a common level. This depressing influence is not developed suddenly and distinctly, but silently and secretly the sapping and mining go on till the explosion comes in sickness, suffering, and the sleep that is eternal." (N. H. B. of H., page 216.)

If it is necessary to have cellars, then it is most essential that they should be well drained, well lighted and well ventilated, and the manure instead of being dumped into the cellar should be carried some distance from the buildings. Care should also be taken that the well is not situated so as to receive the surface drainage. Too often the well is situated in or near the

barnyard, and I have known cases where through either ignorance or carelessness, the cows were watered from a puddle or hollow near the barn into which the surface water from the barnyard drained.

Light is another essential that is almost entirely neglected. Good light is just as essential to the health of the "higher animals as it is to plant life." We ordinarily get too much in the habit of viewing light in barns, as being simply for the purpose of enabling us to see what we are doing. Light, however, has a direct bearing on the health of the body and an even more direct influence on the causation of this special disease under consideration. Light is especially necessary where, through want of exercise, the circulation is sluggish and the system is depressed; light will stimulate the circulation; it increases the oxidation; more CO_2 is given off, and the functions of the whole body are quickened and enlivened. But sunlight also retards the growth of germ life, and more than that, the vitality of certain forms of bacteria, including anthrax and tubercle bacilli, is destroyed by the action of light. So that while light is necessary for the healthy development of the higher forms of life, it is detrimental to the lower forms of life. And yet in how many barns are we able to see distinctly? In how many barns can we even see to read a thermometer without going to the window?

Nor are the above the only conditions that tend to impair the health of the dairy cow. On the average farm no care is taken, not a single precaution is observed to prevent the health of the dairy cow from breaking down under the strain to which it is subjected. Everything is made subservient to the one sole and single object of getting a large milk supply.

One would think that common sense would teach that keeping cows for months without stirring out of their track, is, to say the least of it, an unnatural condition of things. Exercise is just as necessary for a cow as it is for the rest of the animal kingdom, yet it is something the dairy cow does not get.

Every one knows that exercise increases the flow of blood to the muscles, and in consequence of the greater amount of waste products carried off and the greater amount of oxygen required by the system, a quickening of the heart's action and a quickening of breathing result. On the other hand, when little or no exercise is taken the circulation becomes sluggish,

the heart, like any other muscle, degenerates for want of use. The breathing becomes shallow, and the lungs are not expanded. When any extra strain is put upon them they are not able to do their work, and we have rupture and permanent dilation of air cells, along with weak lungs and a predisposition to pulmonary disease.

Exercise, on the other hand, causes an increased flow of blood to the lungs with an increased vitality and strength. The increased flow of tidal air in and out of the lungs will tend to prevent the slow growing tubercle bacilli finding lodgment, and in this way prevent its growth and development in the lungs.

In referring to exercise, I don't wish to be understood as advocating a large field or range for the cattle to run over. I don't wish to advocate anything impractical; but I do think that the present method of confining the dairy cattle with stanchions is capable of improvement. I do think they ought to be allowed their liberty, and further, I do not see anything impractical in any such suggestion. Any condition that affects the comfort of the animals, must affect their general well-being. Every one here must have seen how cows will rub and scratch themselves when first let out for water; often, even when thirsty, they will not touch the water till they have licked themselves all over. It is impossible to stand behind a row of cattle for five minutes without seeing one or the other make a more or less ineffectual effort to scratch the body. No animal can be comfortably confined as they are in New England at the present time.

Every one knows that these conditions exist and that they are detrimental to the health of the animal. Then why are they not attended to? It is because through force of habit we have got accustomed to them, we simply take it for granted that these conditions can't be improved, and, gentlemen, until we pay greater attention to the common, every-day life of the dairy cow, we will never reach the true solution of this momentous question.

"*Their surroundings make them what they are.*"

DIAGNOSIS AND PREVENTION OF TUBERCULOSIS.

By J. F. Winchester.

[Read before the Massachusetts Veterinary Association.]

It is essential in discussing the diagnosis of tuberculosis to bear in mind that the veterinary surgeon may be called upon to say whether an animal is affected or not, under two very different circumstances. He may, in one instance, be expected to make a differential diagnosis in a case where the animal is noticed to be ill and regarding which his advice is desired by the owner ; or in another animal, as a veterinary inspector, he is expected to recognize the disease, when, to the ordinary observer and owner, the animal has the general appearance of health. It certainly must be very apparent that if there exists any uncertainty in the first of these conditions, by a physical examination, how much greater must that difficulty be in the second. In order to illustrate this difference, one ought to bear in mind the lesions found at the autopsy of animals that have died from or have been killed as being hopelessly diseased in the first instance ; and those lesions of tuberculosis which are found in animals killed for food and supposed to be healthy at time of slaughter, in the second.

The lesions of this malady have a very different distribution when we take account, not merely of the animals about which veterinary advice is sought, but of all cases in which tuberculosis in any degree is brought to light by a reasonably careful post-mortem examination. An absolutely certain diagnosis can seldom or never be made by ordinary clinical methods.

Tuberculosis may be acute or chronic, and the former may run its course in a few weeks, while the latter may last for years. At the beginning in the acute form, and for an indefinite length of time in the chronic, the diseased process may be confined to one organ or to one region of the body and the symptoms will vary according to the tissue involved.

In all the various forms and seats of the disease, the bacillus may be found in the affected parts. When the lungs are involved in the chronic forms and the amount of the tissue is not extensive, the animal often presents the general appearance of health with, perhaps, the exception of a slight cough. The

diagnosis of such cases by the ordinary physical method, will, as a rule, give negative returns, and suspicion only can be attached to such a case if associated with tuberculous animals. When the lungs become very extensively involved, the symptoms are more distinct and reliable, and then the general appearance of the animal will assist. The fact that the lung in tuberculosis consolidates in patches with intervening spaces of normal tissue, will aid one to differentiate it from many other forms of lung trouble. In the bovine race, when a certain amount of the lung is diseased, and that by any means not slight, they will gain in flesh, if the digestive system is in a normal state, while at a point beyond that necessary for the required oxidization of the blood they will fail ; the same clinical fact is seen when the pleura is extensively diseased.

The diagnosis of this disease in the digestive tract is impossible in the early stages by the usual method, and it is only when emaciation, diarrhœa, constipation, and periodic attacks of hoven occur, that one might be justified in condemning the animal, if there are no other associated symptoms.

Occasionally one will see a bovine with chronic hoven and if associated with tuberculosis, the post-mortem will often reveal an enlargement of the lymphatics at the cardiac portion of the œsophagus, posterior to the diaphragm.

The differential diagnosis of the diseases in the udder is very essential, for it is frequently tuberculous. When simple mastitis is present, you will find a diffused swelling of the quarter affected which is hot and painful to the touch, the milk changes in its physical appearance, and, as a rule, it responds quickly to treatment. When the udder is tuberculous, the swelling is hard and nodulated, and as has been well said, it feels as though it was full of kernels or seeds well defined ; it is neither hot nor painful, nor does the milk change in a marked degree, although in a short time it becomes poorer in quality while it may increase in quantity. The external or superficial glands, in many instances, will decide the question of this malady. They are larger than normal, nodulated, and those on one side of the body will not correspond in size to the opposite. Tubercles are sometimes found in or under the skin, and are easily felt in the form of well-defined nodules.

The placenta in tuberculous animals is often studded with small, opaque, well-defined new formations. The bones and

articulations are not uncommonly attacked, those entering into the formation of the elbow, knee, hock, and stifle joints being most often affected. Lameness is very marked in some cases, the joints swollen and tense, the ends of the bones enlarged. The diseased bone may crumble and sharp spiculæ protrude through the skin. The cerebro-spinal system is not exempt from its ravages, and tubercular meningitis is not infrequent. The symptoms will vary according to the location, from excitement to stupor, paralysis (partial or complete). Some animals will walk in a circle for days with the head down and to one side. Young animals not unfrequently die from acute tubercular menengitis. Paraplegia is seen when the lesions are located in the lumbar region of the spinal cord. It is generally ackowledged that the diagnosis of tuberculosis is no simple matter in any stage, especially where one cannot obtain a history of association with tuberculous animals; then how much more difficult must it be in occult and equivocal cases. Instead of depending upon a physical examination or clinical observation to diagnose this malady, use can be made of the microscope, inoculation, or the injection of tuberculin.

The first two methods require special study and considerable time, which is not practical or desirable when a large number of animals are in question, while the third has been demonstrated to be an almost infallible test with proper care and observation. The tuberculin test is based on the fact, as shown by Koch, that it increases the activity of the disease process, creating a general disturbance of the system which is manifest by an elevation of the temperature. The minute quantity will not affect a healthy animal; when injected into a slightly tuberculous one, it will in from eight to thirty-six hours cause a decided rise in temperature. The explanation of this is, that the system contains tuberculin produced by the disease, to which the animal has become so accustomed, that it cannot be detected by any clinical test. When the small amount of tuberculin used for the test is introduced into the circulation, it increases the activity of the diseased process, and as a result the temperature of the body is elevated. From this fact, it is evident that the quantity of tuberculin to be used ought to vary with each animal, but experiments and observation have demonstrated that for ordinary-sized cows, a certain amount (.25 c.c.) can be relied upon for positive results in occult cases.

Cases may occur in which the temperature of a cow will rise after the injection of tuberculin, and still the animal is not tuberculous. Any febrile disturbance that may set in after the injection; the period of heat or bulling, close approach to parturition, active exertion, exposure, too hot sun, confinement in close building or privation of water.

It is evident from these facts, that only the trained veterinarian should use tuberculin, and he must always be on his guard not to mistake any febrile disturbance that might arise other than would occur by the use of tuberculin in the tuberculous. Laying aside these and other causes of error in unskilled hands, the elevation of the temperature should not condemn tuberculin but stimulate a search for occult tubercles, and a failure will be rare.

There are cases where the animal is tuberculous and the injection of tuberculin will not cause any febrile reaction. In such animals the system is saturated with tuberculin, and the small amount injected will not make an impression. These cases are readily diagnosed by a physical examination. A reaction will take place even in the slightest case of tuberculosis by the use of tuberculin, and many of the animals would live for years and might recover. For this reason, when it is desirable to dispose of the diseased animals or to exclude from a herd any that are tuberculous, it is indispensable as a diagnostic agent. When tuberculin is properly prepared it will not injure a healthy animal. That it will aggravate tuberculosis already in existence is an established fact, and for this reason it has demonstrated its value as a test. Knowing this, it should never be used unless the owner or the government intends to make thorough the work of eradicating the diseased animals.

Tuberculosis has been described as a universal panzootic, and from the deaths in the human subject of this disease, it can well be termed pandemic. This being evident, prevention is certainly the most rational method of making any inroad into its prevalence.

Fleming in his *Sanitary Science and Police*, published in 1875, under the heading of "Prevention," says: "The only preventive measures with which we are acquainted are those of a hygienic kind; proper food and water, sufficient exercise in the open air, clean, dry, and well ventilated, but not too

cold, stables, and keeping the cattle from undue exposure to severe weather. As there is reason to believe that the malady is hereditary, cattle having any tendency to it should not be bred from.

"As the experiments which have been conducted by most competent authorities have demonstrated that tuberculosis can be induced in animals by feeding them with tubercular matter, care must be taken that this is not given to them as food. There being much reason to believe that the disease can be transmitted by co-habitation, whenever cattle show any tendency to it, they should be isolated from the healthy, and every precaution observed with regard to preventing contact. Animals slightly affected should be fattened and slaughtered, and their flesh, if *free* from traces of the disease, may be utilized. The milk of such animals should be proscribed, and in advance cases, the flesh also."

It is readily seen from this quotation that the requirements for protection against the disease, either in man or animals, are the same. It can be concisely stated in the word hygiene. I doubt if any one will take exception to the statement that sunlight, combined with cleanliness, proper drainage and ventilation, is necessary to maintain and create a constitution capable of resisting disease. Tuberculosis is an infectious disease, and with the means we have to diagnose this malady, there cannot be any excuse why the products of tuberculous animals should be used for the benefit of man.

In a brochure issued by the State Board of Health of Massachusetts, May, 1894, it is admitted that the milk from tuberculous animals is a menace to the health of mankind, and it should be proscribed. In regard to the meat from such animals, they recommend its thorough boiling, although they do not feel confident that it will cause the disease, since clinical evidence to that effect is not in existence. Since tuberculosis is a preventable disease, undoubtedly there are cases that will recover. This being a fact, why allow or sanction even the use of tuberculous meat, when it is known that the ptomaines or tuberculin which exists in the flesh of tuberculous animals is not destroyed by boiling, and if introduced into the system of a tuberculous individual, will excite the activity of the disease. It is not desirable to ameliorate a case of tuberculosis after the possibility of prevention has passed. It is

admitted by the producers of vaccine virus that the bovines that are used for its production should be in a normal condition and that for this reason they are examined by a veterinarian in some instances, and at other times by a supposed-to-be competent man.

In an article in the Boston *Medical Surgical Journal* for May 3, on production of vaccine virus no evidence is shown that tuberculin is used. Then of what value can be an opinion as regards the existence of tuberculosis in its occult form? One firm uses mature animals in order that the lymph may be richer in germs, while the other (of the two firms examined) use young animals that are less liable to be diseased. In neither of their establishments does it appear that the product of each animal is kept by itself, and the animals killed allowed of an examination to establish the fact of its normal condition.

In conclusion let me congratulate the State Board of Health for its bulletin, as a step in the right direction for the prevention of this, the most universal and insidious of all diseases in the animal kingdom.

Authors cited: Makenzie, Law, McFadyean, Saunders, Robertston and Billings.

DIGITALIS.

By—— ——

[Read before the Massachusetts Veterinary Association.]

Digitalis or foxglove has long been used empirically in the veterinary profession in cough powders, diuretic powders, fevers of all kinds, and among horsemen for faint-hearted trotters; and it is not uncommon to see a prescription containing aconite and digitalis. The leaves of digitalis perpurea gathered from plants of the second year's growth are the ones used. Digitaline, which was formerly officinal and considered as the active principle, is a mixture of several products, the most active of which is digitoxin which with digitalin and digitalein represent the cardiac stimulating action of the drug, while digitonin appears to exert a contrary effect.

A fifth substance, digitin, seems to be devoid of physiological and therapeutic action. These are all non-nitrogenous and with the exception of digitoninare glucosides no alkaloid is present in digitalis. Digitalin is insoluble in water but soluble in alcohol. Digitoxin is insoluble in water, sparingly soluble in alcohol. The ordinary commercial digitaline is principally digitaline; it is a very active preparation. The tincture and the fluid extracts of digitalis contain both digitaline and digitoxin; the infusion contains principally digitonin and very little digitoxin.

In studying the action of any drug it is but natural, first to consider the symptoms which it will produce in a healthy animal.

A half a dram of extract of digitalis will produce no effect in a matured horse, but if the dose is repeated at short intervals, the pulse becomes slower and stronger, the diastolic pulse grows very long and the individual heart-beat sends a great rush of blood which rises and swells with a power scarcely ever equaled under other circumstances in the pulse. If the administration be persisted in by and by each pulsation will become forked or dicrotic.

Sometimes digitalis seems to have no effect, but suddenly develops most alarming symptoms. The explanation of this action is its slow absorption and still slower elimination, for certainly the phenomenon is especially prone to occur when the drug fails to act as a diuretic. The effects are more often noted after the drug has been used as in ascites and pleurisy with effusion following tapping. Wood says the explanation of the phenomena is that the drug is active *only* in the *circulation.* Tapping relieves the pressure from the blood vessels and the large amount of the drug in the serum is absorbed, and becomes active on entering the blood. Precisely the same result is seen in the use of potassium iodide after the persistent use of mercury. The mercury inert in the tissues rendered soluble by the iodide, enters the blood and suddenly shows itself.

Digitalis is a pure heart tonic, in fact the only reliable one. Its action is slow but sure. In the days of using so many anti-pyretics of the coal products that have such a depressing action on the heart, digitalis becomes a most valuable adjunct.

Acetanilid is being used to a great extent in veterinary

practice as an anti-pyretic and may be truly said to be a very effectual one, but without digitalis it would result in untoward effects.

The mode of action on the heart has been discussed by more learned men than I, but the accepted action is summed up to be stimulation of the inhibitory nerve, motor ganglia, and the muscular fibres themselves. Its diuretic effects are secondary from rise of blood pressure and results in increased absorption of existing fluids. Aconite and digitalis are antagonistic. The former slows the heart by expanding the peripheral vessels and lowers the blood pressure. The latter reduces the number of contractions by stimulating the inhibitory fibres in the vagus and contracts the arterioles, thus causing increased blood pressure; aconite directly lowers the action of the cardiac motor ganglia and is a cardiac poison. Digitalis indirectly exhausts the motor ganglia by over-stimulation; after death the former heart is in asystole, and the latter systole. I remember an experiment while at college of stopping a frog's heart with aconite, starting it with digitalis, and then being unable to stop it again with aconite, showing that digitalis might be an antidote for aconite but not the reverse.

Owing to the slow action of digitalis, it should, in such cases, be given hypodermically, as also in collapse or syncope from anæsthetics of all kinds, general exhaustion, sunstrokes, etc. In our patients, where fever drops of varied compounds are used by the laity for almost every disease that the poor animal is heir to, digitalis is a most excellent remedy, as their composition is largely of aconite and veratrum veride, especially in pneumonia and influenza. Right here I want to call your attention to how death is produced in pneumonia. There is high temperature, also a portion of the lung filled up by exudation. What is the result? A right heart, weakened by heat and by the exhaustion of effort and depressed by the poisons of pneumonia, finds itself in the presence of an ever-growing obstruction so that the right heart pushes and endeavors to force the blood through the narrowed vessels and is more and more strained until at last it goes into that condition known as over-nervous stimulation, irritability, failure of diastole, failure of systole; give digitalis, and it stimulates the inhibitory nerves, lengthens diastole, allowing the coronary arteries to fill, thus giving strength to the muscular fibres, and with its strong hand grasps systole,

driving the blood through the narrow vessels. Under these circumstances digitalis, increasing the power of the right heart, may save the life of the patient; also in cases of lymphangitis, oedema of the limbs and acities, and as long as the diuretic effects keep up, no bad results need be apprehended.

Those cases of intermittent pulse in convalescent influenza are greatly benefited by one ounce doses of the tincture three or four times a day. In pleuritic effusions, I have not found much benefit from its use. The tincture fluid extract or infusion may be used; of the tincture one to two ounces, fluid extract one-half to one ounce.

The contra-indications are anneurism, fatty degeneration of the heart and all digestive troubles either of the stomach or the bowels.

In conclusion, gentlemen, I hope you will give this drug a trial, if you have not. Study its action, as there is no better way of becoming familiar with the action of a drug than one's own experience.

PREVALENCE OF TUBERCULOSIS.

By Dr. Austin Peters.

[Read before the Massachusetts Veterinary Association.]

Mr. Chairman and Gentlemen: I have been invited to open the discussion of the subject we have taken for consideration this evening by saying a few words upon the prevalence of bovine tuberculosis, and in doing so I shall be as brief as possible, because we have a number of interesting speakers to listen to, who will call your attention to this question from different points of view, and also because it is very difficult or almost impossible to obtain any reliable figures showing its frequency among our neat stock.

Tuberculosis has been known for all time and among all civilized people, and in all habitable climates; among cattle-keeping people it is known among their bovines; and while it continues to exist among the human race, it will prevail among their cattle, its prevalence among the latter depending upon

how they are kept, where they are kept, what they are kept for, and upon the susceptibility of certain breeds or the constitutions of certain individuals.

Among the human family as well as among the ox tribe has Pharaoh's dream been constantly repeated from the days of Joseph to the present day; the seven well favored, fat-fleshed kine have been devoured over and over again by the seven ill favored and lean-fleshed kine, which I have not the least doubt were suffering with tuberculosis, and it is not even necessary to have the seven ill favored and lean-fleshed kine to devour the seven healthy ones, for if a single tuberculous cow be placed in a dark, badly ventilated stable with the seven well favored ones kept under unhealthy surroundings and forced to an enormous yield of milk, this single ill favored and lean-fleshed individual will in time succeed in devouring the seven well favored ones, notwithstanding the fact that the milk from this herd yields the greatly-to-be-desired thirteen per cent of total solids, yet will there be "death in the pot," or rather the milk can, "consumption at eight cents a quart," or cholera infantum at the same price, or a pleasing mixture of the two commodities combined.

Admitting that tuberculosis is due to a specific germ, the *bacillus* of *tuberculosis*, and that it can be communicated from one animal to another of the same or a different species, by means of the expectorations after they become dry, or by the consumption of the flesh and milk, or dairy products of tuberculous cattle, yet in order to appreciate the danger to human beings from the use of the dairy products of tuberculous cows, it is important to have some idea of its prevalence.

It is an impossibility to get any statistics to show the extent to which this malady exists among our bovine population, but I think I can show that it is of sufficient frequency to be of very great importance from a sanitary and economic stand point. Fleming in his *Manual of Veterinary Sanitary Science and Police*, in speaking of the geographical distribution of this disease among animals says:—"Tubercular phthisis or tuberculosis probably prevails among the domesticated animals over the entire globe, though its frequency will depend upon various external influences, as well as the constitutional tendencies of different species and breeds. In some countries it is enzootic and very destructive. Such is the case in densely

populated districts and in unhealthy climates, or in regions where animals are improperly fed and housed. In Mexico, for instance, it is very common, and causes much loss; about thirty-four per cent of the animals slaughtered for food being found affected. In Europe, particularly in the cow-sheds of the large towns and cities, it is extensively prevalent; and in this country (meaning England) it has long been recognized as a common disorder among animals, but more especially as affecting the bovine species."

Walley's "Four Bovine Scourges" considers contagious pleuro-pneumonia, rinderpest, foot and mouth disease, and tuberculosis as the four great cattle plagues of the world.

In this country rinderpest is unknown; foot and mouth disease does not exist at present; contagious pleuro-pneumonia has been stamped out in every locality in the United States where it has ever existed, so that to-day we can safely say that the only one of the four great bovine scourges staring us in the face and challenging us to combat, if we are not afraid to grapple with it, is tuberculosis.

During the past four or five years many of the States, particularly in the East, have been aroused to take steps to eradicate tuberculosis from among their neat stock, chiefly by having the work attended too by cattle commissions, and while numbers of cattle are examined, yet as a rule the work has not been done in a way to give any idea of what relation the number of diseased cattle bears to the number of healthy ones, or what the ratio of herds where the malady exists is to the herds where the creatures are all healthy.

During the winter of 1892 and '93, the New York State Board of Health, having been empowered to regulate the matter of bovine tuberculosis in that State, undertook a farm to farm inspection of the cattle in two dairy districts, with a view of ascertaining about the per cent of tuberculous cows in a certain region. In lower Westchester County approximate 10,000 head were examined, and in the neighborhood of eighty were destroyed as tuberculous, or .8 per cent. In Orange County, in the neighborhood of Monroe, about 10,000 head of cattle were examined, and thirty-five were killed as tuberculous, or .35 per cent.

In testing herds with tuberculin, I have found that by means of the old fashioned physical examination, about one case out

of three present could be picked out, that is after diagnosing the cases present in a herd by means of a physical examination, and then testing it with tuberculin, three animals will react to every one found by means of an ordinary diagnosis. Taking this for granted, it is safe to say, that among the herds of the farmers in a district like Orange County, which somewhat resembles Worcester County, that about one per cent of the cows are tuberculous, these herds being made up largely of hardy grades of the Ayrshire, Holstein and Short-horn families. In Westchester County, nearer New York City, where more cattle of the Channel Island breeds are found, and the system of dairy farming more nearly resembles the milk-men's management on the outskirts of our large towns and cities in eastern Massachusetts, it is safe to say that between two and three per cent of the cows are tuberculous, allowing that only one case can be detected by means of a physical examination to three that will show a well marked reaction to tuberculin. These figures compare quite evenly with the abattoir statistics of many of the cities of France, Germany, Belgium and Holland.

In eastern Massachusetts we have no exact figures to give us statistics, but it seems to me that bovine tuberculosis must be much more frequent here than even in Westchester County, N. Y., or else I have been unfortunate enough to be called to see so many herds where tuberculosis exists, during the past winter as to prejudice me into this belief. Since December 1, last, I have had occasion to examine about 500 head of cattle in eastern Massachusetts, of which seventy-five have been tuberculous, but then of course I am very likely to be called to examine creatures where the presence of tuberculosis is known or suspected.

As to the prevalence of tuberculosis among cattle of various ages and sexes, abattoir statistics show it to be very rare in calves killed for veal. It is seldom seen in steers and oxen killed for beef, in fact, it is almost unknown among our Western beeves. It is seen chiefly in cows when slaughtered for food, and is met most frequently among dairy cows from the outskirts of large cities and towns, here it is found more among the older cows, the lesions being much more readily found in cows over six years old, than among those younger. That is, overcrowding in unsanitary stables and the depleting influences of lactation are the two great predisposing causes. Among certain

fancy herds of pure-breds of different breeds tuberculosis exists to an alarming extent, but this is because some of our breeders have nurtured this malady as carefully for years, as though they were trying to breed tubercle bacilli instead of cattle.

In Massachusetts our system for dealing with bovine tuberculosis is faulty; in the first place this is a commission-ridden State; everything is managed by commissions of three or more men. It is a well known fact that an army with three generals would meet with defeat; a ship with three captains would meet with disaster; a railroad with three superintendents would go into bankruptcy; and yet, that which would bring defeat in war, disaster to commerce and bankruptcy in business, is expected to work successfully in the affairs of an over-taxed people. These are the views of Seth Low, president of Columbia College, and Gamaliel Bradford. The only possible excuse for such a system is, that it furnishes salaries for a lot of played out politicians and impecunious lawyers, instead of placing the management of affairs in the hands of single responsible heads directly accountable to the appointing power.

Another criticism of the present state of affairs, is the system of town and city cattle inspectors. One city or town may appoint a competent veterinarian to such a position—these instances are rare—a few more cities or towns may appoint an incompetent veterinarian, who is but a very slight improvement over any other ignoramus, but in most instances the appointees are men of no special qualifications for the positions they hold; their examinations of herds are farces, and the certificates they write are not worth the paper they are written on.

I am in favor of having a State veterinarian who shall be responsible either to the State Board of Health, or to the State Board of Agriculture, depending upon whether this subject is considered most important from a public health or an agricultural point of view, then divide the State into districts, say ten or a dozen in number, and appoint the best veterinarian in that district (that is, the best cattle practitioner, as the best horseman is not always the best cowman) district veterinary inspector to act under directions from the State veterinarian. Furthermore, owners of animals suffering from contagious diseases should be reimbursed. The co-operation of farmers in eradicating bovine tuberculosis will never be secured until this is done. There should be also an arrangement for utilizing the

meat of slightly diseased cattle for food, and the proceeds of these sales should be used for helping to pay the expenses of this work. It is an outrage to destroy a man's property without paying for it; and absurd to say that tuberculous cattle are not property.

The relation that the use of milk from consumptive cows bears to the malady in mankind will never be known until thorough steps are taken to prevent its use. If all the tuberculous cattle in the State were killed to-morrow, and infected stables burned there would be a fresh supply in a few years from the contamination of consumptive persons, unless boards of health and physicians are ready to look upon it as an infectious disease, call it thus in annual reports and vital statistics, and take steps for preventing its spread from person to person and from mankind to the cow. If we start a crusade against the poor cow, without taking any other precautions to guard against it, we shall be simply continuing to prevent a waste at the spigot while there is a big leak at the bung.

Sterilizing food is a safeguard to the public health; on the other hand there is the economic standpoint of great importance to the farmer of protecting healthy from diseased cows.

I suppose that what I have said will lead to the old hue and cry that, "the horse doctors want a pull at the public crib, but they sha'n't have it" so long as there are any fossilized politicians, unsuccessful lawyers, or even decayed labor leaders to be provided for; but let me remind you that a capable veterinarian can make more in private practice than the salaries usually paid by the State amount to, and as I generally give my text at the end of my sermons instead of the beginning, I will simply suggest to you "To render unto Cæsar the things that are Cæsar's, and unto God the things that are God's."

THE AGRICULTURAL ASPECT OF TUBERCULOSIS.

SECRETARY SESSIONS, MASSACHUSETTS STATE BOARD OF AGRICULTURE.

It is but a few years since tuberculosis in cattle is known to the public to be prevalent. The attention of scientists, particularly of veterinarians, has lately been directed to the disease as a source of danger to the life and health of the human family. Investigations have proved the disease to be generally prevalent among the cattle in all thickly inhabited countries, although most of the cattle affected show few outward indications of the disease. In fact a large majority of such infected animals are apparently healthy and the presence of the disease cannot be detected with certainty without the use of tuberculin.

The danger to human life and health has been discussed and magnified until the public are demanding action, by the State authorities, for their protection. Authority has been given the Cattle Commissioners to kill without appraisal all cattle found to be infected with the disease.

The discovery that the injection of tuberculin is a very reliable method of detecting the disease has led many to believe that this should be applied by the authorities to all suspected herds and some people are of the opinion that all the cattle of the State should be subjected to this test. From the experience thus far had in the use of turberculin, we are led to believe that a large proportion of the cattle that are apparently healthy would be condemned by this test. The present law provides no recompense to the owner of such cattle. These conditions make the agricultural aspect of tuberculosis very serious indeed. The neat stock of the State is rapidly decreasing, the decrease having begun with the agitation of the danger from tuberculosis. In 1890 200,658 cows and 62,549 neat cattle other than cows were assessed. In 1893 186,806 cows and 47,528 neat cattle other than cows were assessed, a decrease of 13,852 in cows and of 15,021 in other neat cattle, making a total decrease of 28,873 in three years. The number of cows had been previously quite steadily increasing for thirty years from 149,090 in 1861 to 200,658 in 1890.

The dairy is easily the most important branch of farming in Massachusetts. The State census of 1885 gives the latest reliable figures. By that the value of dairy products was $13,080,526; hay, $9,676,893; other staple products, $4,578,763; fruit, $2,386,290; vegetables (potatoes are included in staple products), $2,762,941; animal products, $5,398,439. The hay crop is quite largely dependent upon the dairy interest and the animal products are so largely dependent upon the dairy as to be almost a part of it. The veal product is certainly a dairy product and most of the veal of the State is grown on the skimmed milk of our dairies.

If the killing of tuberculous animals is to go on without compensation to the owners, this most important industry must rapidly decrease carrying along with this decrease a still greater decrease in the value of much of the farming property of the State. The fine dairy barns that dot the farms of the State will become valueless and the pastures will be allowed to grow up to brush. The State can ill afford a decrease in its agriculture and in its agricultural population. If the fight against tuberculosis is for the public good, the public should be remunerated, in part at least, for the sacrifice deemed necessary. Especially is this proper in view of the fact that many cases of tuberculosis in human subjects do not terminate fatally, and many apparently recover. I quote from "Tuberculosis in Relation to Animal Industry and Public Health," by Dr. James Law: "Dr. Biggs tells us * * * that in the Charity Hospital of the city (New York), thirty per cent of all deaths show old lesions of tuberculosis now becoming stationary. He quotes a Vienna hospital pathologist to the effect that he finds similar old stationary lesions in eighty-five per cent of all post-mortem examinations. This leaves but fifteen per cent who have not suffered from tuberculosis." It is not too much to claim that a like proportion of bovines slightly affected with tuberculosis would never be apparently injured by it. Such cases should be paid for in full if sacrificed for the public good. But it would be difficult for the officials to discriminate in the matter of allowance for cattle killed, and so it would probably be better to fix upon a portion of the value of the animal in health as to the amount that should be paid to the owner of an animal condemned because infected with tuberculosis. I believe the owners of neat cattle as a

class are unwilling to bear all the burden. They believe that if the public takes arbitrary possession of their property and destroys it, that an equitable portion of its value should be returned to them. In view of all that we know about tuberculosis, it cannot be absolutely determined what an equitable proportion is, and the matter must be decided by granting an arbitrary part of the original value.

The value of the animal condemned is but a part of the loss to the owner. His business is broken into; his herd is discredited; his customers are afraid of his product; and if permanent future immunity is to be gained by him, he must go to a large expense in disinfecting his barns and stables. This disinfection is out of his line, but is as necessary to the public health as the slaughter of infected animals. The State should see that it is properly done, and it could be done cheaper and more certainly by agents of the State than by the numerous private owners. Why should not the State provide for this very necessary part of the protection of public health? Dr. Law says in the paper quoted above that "Sanitary laws which in any way ignore or disregard the rights of property have within themselves the seeds of defeat. * * * If the stock-owner is not fairly reimbursed for his animals slaughtered, and for other losses sustained for the protection of the public health and the country's herds, unscrupulous men will find ample means of trading off the as yet incipient and occult cases of tuberculosis, thereby planting the infection into new herds. Compensation must stop short of making the sanitary bureau a profitable customer for tuberculous animals at sound prices, but it must be so liberal as to enlist the ready co-operation of the stock-owner in having every infected beast safely disposed of."

The State is bound to protect the life and health of the people, and is also bound to do justice to all parties. The State is also, for its own good, bound to foster agriculture, for no nation can long continue prosperous without a prosperous agricultural population. A large per cent of the successful men of our nation have always been from those born and reared on farms. It must continue to be so; and the more prosperous the rural population is, the larger proportion of able and faithful young men will it furnish for the service of the city, state and nation.

DAIRY INSPECTION.

By Dr. F. A. Bolser,
New Castle, Ind.

[Read before "Indiana Association of Veterinary Graduates," July 10, 1894.]

Mr. President and Gentlemen: Dairy inspection is, at the present time, a very attractive subject to the veterinarian, from the fact that he can see not only a broad field for the improvement of the health of the people of this country, but also the stamping out, in a measure, of one disease whose death roll each year is greater than was that of the late war.

That to which I refer is not the only disease that can be contracted through the use of milk and its products, but it is the most dreaded disease, as the others may terminate favorably, such as diphtheria, scarlatina, and so forth, which could be nearly if not completely prevented by strict sanitary measures.

At present we are handicapped in this State for want of proper legislation, appropriations, and so forth, by means of which all cattle intended for breeding and dairy purposes might be inspected.

Several of the Eastern States have legislation providing for the inspection of all dairy cattle; and the number affected are found to an alarming extent.

The officers of the State Board of Health, at their last meeting, passed resolutions, asking that the next Legislature pass suitable laws, and make sufficient appropriation, to provide for efficient dairy inspection. We, as veterinarians, will be only too glad to extend any aid that may be in our power, not only in getting proper legislation, and so forth, but in carrying out the inspection. I would suggest that the appropriation be sufficient to compensate owners for all affected animals destroyed, from the fact that that would be an incentive to the stock raisers and dairymen to have their herds inspected.

Some Eastern dairymen, who prided themselves on having healthy cattle, were very much surprised to find that on using the tuberculin test, and having the animals that showed the infection slaughtered, upon post-mortem examination that a very large per cent had tuberculosis.

One of the strongest points in favor of dairy inspection and stamping out tuberculosis is the fact that one out of every eight persons dying in the United States die from this disease.

In some counties of the old country, where the milk of the ass or goat alone is used, consumption is unknown. Through the energetic action of the Bureau of Animal Industry pleuropneumonia was completely eradicated from the United States; the eradication of a disease whereby the stock raisers of the United States were saved millions of dollars. Thus was eradicated a disease that was not communicable to the human family either by the use of the flesh or the milk and its products.

If such strenuous efforts were made to prevent the spread of a disease that was simply the cause of a pecuniary loss, why should not a more determined effort be made to stamp out a disease which costs this country annually the lives of thousands of its best citizens?

To accomplish this measure we should first have proper legislation and sufficient appropriations, as heretofore mentioned, to allow the Sanitary Board, which should be composed mainly of veterinarians, the power to inspect and destroy all animals found to be suffering from tuberculosis in any form, upon remunerating the owners of such animals for the same. All dairy and breeding establishments should be inspected a stated number of times annually, and their sanitary condition carefully examined, as to cleanliness, drainage, and so forth, and no new animals be allowed to be used in a dairy without first having been examined.

The inspection should not end with dairy and breeding cattle. The number of families who own one cow and supply a number of families with milk are innumerable, and in the majority of cases the sanitary surroundings are of the worst kind. They, too, should be inspected. There should be a chief inspector and a sufficient number of assistants to co-operate with the Board of Health of each county. Each county Board of Health should have a veterinarian as one of its members, who would be the local inspector for that county. He should inspect all animals, and look after the sanitary conditions of all dairies, and make his reports to the chief inspector, as the Legislature may require.

It should be the duty of the chief inspector, either personally or through his assistants, to examine all dairy and breeding establishments together with the local officer, at least twice a year. The inspection should be compulsory, and the sale of milk and its products from any animal not having a certificate of inspection as sound should be prohibited, under severe penalties.

The people do not realize the danger which might be overlooked by not making a thorough inspection; in fact, they do not realize the enormous dangers of using dairy products from animals afflicted with tuberculosis; many of them not knowing that consumption is communicated in that way, nor do they realize that there are many other troubles originating through dairy products, from the lack of proper sanitary conditions.

Doctor Boor, of Muncie, relates a case as follows: On April 10 last, accompanied by the State Veterinarian, Dr. Stull, and Live Stock Sanitary Commissioner Hall, they visited a case of suspected tuberculosis on the farm of Mr. A. Upon examination they found the animal to be in the last stages of tuberculosis. The State veterinarian ordered her destroyed, which was done, and also her calf, which was likewise affected, was at the same time destroyed. About the time the cow was destroyed, Mrs. A. was taken sick, and is now suffering from a well-marked case of consumption; whether having been transmitted by the cow, or whether merely incidental, cannot, of course, be stated, but at the same time there are probably thousands of cases similar that have been passed unnoticed. It is a well-known fact that thousands of children die every year with tubercular bowel trouble, caused from the milk obtained from tubercular animals, the delicate mucous membrane not being of sufficient vitality to throw off the dreaded germ. It is also true that you and I, in a debilitated condition, could not throw off the germ of tuberculosis.

It is hardly worth while for me to continue the subject any further, as you all realize the danger as well as I; but I would suggest to all of you that you confer with your representatives and senators from your district, and impress upon the mind of each the necessity for legislation by educating him. Show him the danger arising from this disease in cattle, give him literature on the subject, and let him come here next Winter scared to death.

TETANUS.

By J. H. Eddy, D. V. S.
Stockton, Cal.

[Read before the California State Veterinary Medical Association.]

At the last meeting of this Association, I was appointed by our honorable president, Dr. Spencer, to write upon some subject pertaining to the veterinary profession. I do not propose, by presenting for your considerations this paper upon the subject I have selected, which is *tetanus*, to speak much from practical experience, but, nevertheless, the following remarks may serve to refreshen your memories and perhaps give some of you new ideas. The word tetanus, is drived from a Greek word which means, to stretch. It is a specific disease, characterized by continual contraction of the voluntary and later the involuntary muscles, and with tension and rigidity of the parts affected, When the term tetanus is used, it implies that the whole body is involved. It is often that only the muscles of mastication are involved ; we then call this condition *trismus*. If the muscles of the cervical and dorsal regions are involved the term *opisthotonus* is applied. If the muscles of one side are involved, we term it *tetanus lateralis*.

This disease is now considered to be due to a micro-organism, which is a drumstick-shaped bacillus called bacillis tetani or the germ of Nicolaire, so named from the investigator who discovered it in 1886. But it seems that Rosengoff and Koch recognized it at about the same time. The germ has a spore of reproduction at one end, and is anaerobic in character. This is quite important. We will understand from this why a small punctured or closed wound is more liable to be followed by the disease than a large open one. No doubt some of you have seen cases which developed after a wound had almost completely healed, the conditions then having been of the nature of a closed wound. The anaerobic character of the germ explains this. The exogenous character of the germ was discovered by Nicolaire, April 10, 1887. He found it in the soil, especially around old gardens. It is found in horse manure ; also upon surgical instruments, improperly sterilized, that have been used upon a wound infected with the germ, which may be transmitted

in this way from one animal to another. In the diseased animal the germ remains quite local near the seat of introduction; it is found in the secretions of the wound, in the nerves leading from the wound, and some claim to have found it in the spinal cord. The presence of the oxygen of the air causes the germ to remain in a partially dormant condition, but as soon as it is introduced into a wound where the air is excluded, combined with the heat and moisture it causes, it commences to develop and reproduce. Kitasato, a Japanese student in Dr. Koch's laboratory, isolated the soil bacillis and reproduced the disease in animals by inoculation, thereby proving that the germ found in the soil was identical with that found in the wound of an animal affected with the disease. Professor Theodore Kitt, of Munich, made some interesting experiments in the way of inoculating several horses from a horse that had died from tetanus and he concluded by saying that tetanus in the horse is caused by a bacillis identical with and resembling that found in tetanus in man and in the soil. Another interesting contribution on this subject is that of Dr. Bassano, whose excellent work in demonstrating to us the presence of the bacillis tetani in different soils is valuable.

He found upon examination of forty-seven different soils from different countries that twenty-three contained the germ of tetanus. From the various clippings I have here presented I think we can safely arrive at the following conclusions: (1) That tetanus is a specific infectious disease; (2) that the specific germ does exist outside the animal economy; (3) as the germ is found in the soil, dry dust, manure, etc., it is quite difficult to determine the origin of the infection.

The observations of Dr. Sarmoni should not be overlooked in regard to the action of the intestinal secretions upon the bacillis of tetanus. He says that he has caused herbivorous and carnivorous animals to swallow pure culture of the bacillis and thus arrived at the following conclusions: (1) The flesh of animals that have died from tentanus can be eaten with impunity; (2) the microbe of tetanus can pass through the alimentary canal of carnivorous and herbivorous animals without causing any symptom of the disease; (3) the digestive secretions of these animals neither kill or in any way alter the bacillis of tetanus; (4) an animal can take into the stomach

with impunity a dose of tetanic virus 2000 times greater than that which is sufficient to kill if injected subcutaneously.

We have now considered the history of the germ of tetanus to a certain extent. *We will* now consider the etiology. There are described two *classes etiological* of the disease: The *traumatic* and the *idiopathic*. The traumatic form is due to a wound or some abrasion of the skin or mucous membrane. Tetanic symptoms usually follow in from two to twenty days after the germ has been introduced. The reason for the variable length of time is: (1) The number of germs introduced; (2) the advantages given the germ. It may follow castration, tail-docking, etc. I have seen it follow the operation for umbilical hernia in a colt. Intestinal parasites may also be mentioned as a cause. After this micro-organism gains entrance to a wound, the heat, moisture, etc., as I have mentioned before, arouse it to increased action. As the germ itself remains quite local or near the seat of inoculation, it is now believed that the product of the germ, the ptomaine, as it is properly called, is the cause of the disease, inasmuch as these potmaines are taken into the circulation and in some way poison the blood, which in turn so affects the nervous system as to cause rigidity of the muscles so characteristic of the disease.

The idiopathic form is caused by exposure to cold rains or extreme heat. It may follow a mild case of sunstroke; I have seen a case of trismus brought on by an animal being overworked on a hot day. This case recovered entirely within three days. I do not think it necessary to take up valuable time in giving the semiology of this disease, for I do not consider it a difficult disease to diagnose after an ordinary examination.

The *Prognosis* of the traumatic form of tetanus is usually unfavorable; if the attack is very mild we may say the animal has even chances. The idiopathic form nearly always terminates favorably.

When death takes place in either form, it usually occurs in from two to ten days, either by complication of the pulmonary apparatus, nervous exhaustion from continual muscular rigidity, or from pyrexia associated with an elevation of temperature to such a degree that the organic functions of the heart and lungs are involved and finally cease. Professor Williams says that in post-mortems of traumatic tetanus he invariably

found the nerves leading from the injured parts to present signs of inflammation, the neurilemma more vascular than normal, the vessels of the spinal cord engorged and the sub-arachnoid space containing effusion.

I will now say a few words about the treatment of this disease. In this respect I have nothing new to offer. These cases are usually well advanced before we are called; at least I have found it that way. I have tried several different courses of treatment without the desired result. I had some to recover, but I cannot say that it was the treatment, as I have tried the same remedies in other cases that terminated fatally; perhaps those that did recover would have done so even if they had not received the treatment. There is a treatment advanced which it is claimed acts like magic. It is as follows: inject into the veins of the affected animal the blood serum obtained from a recently recovered case. This it is said destroys the virus. To do this it would be necessary to have a recently recovered animal on hand all the time, and the treatment consequently is not practicable. Some claim to have an infallible remedy for this disease, which they keep for their own use. I dare say they have not, but when this kind of a drug or combination of drugs is discovered I shall be pleased to hear of it, am sure it will be a welcome addition to veterinary science.

DISEASE OF THE LIVER AS A DIRECT CAUSE OF INTESTINAL DISTURBANCES.

By Dr. D. F. Fox,
Sacramento, Cal.

[Read before the California State Veterinary Medical Association.]

Mr. President, and Gentlemen: In compliance with the request of our honorable president, and in order to assist in a small way in making our meetings as interesting as possible, I have to the best of my ability prepared a short thesis on "Diseases of the Liver as a Direct Cause of Intestinal Disturbances," which I will now submit to you for your consideration.

This is a subject, gentlemen, to which I have paid particular attention in the last couple of years, and owing to its

insidious and complex nature, and its being a subject which it is so difficult to ameliorate and which in my experience does not readily yield to treatment, I naturally feel very anxious and ambitious to learn from an exchange of ideas of those present here to-night more about the pathology and treatment of intestinal disturbances. With this end in view, I have attempted to advance a few ideas in which I hope to show that the majority of intestinal diseases are due to hepatic disturbance.

In order, therefore, to approach this subject in a comprehensive manner, we will first take up the consideration of the liver and its physiological functions.

As you all are aware, the liver being the largest as well as one of the most complex and important glands in the animal economy, and as it has some very essential and rather complex functions to perform, it is very easy to understand how any deviation from its normal condition will cause derangements of the alimentary tract.

The most important and one of the chief functions the liver has to perform is the secretion of bile, the only one which directly pertains to the subject under consideration. There are, however, other functions, notably the one that controls the effect upon the blood during its transit through the hepatic circulation whereby it is fitted for its subsequent purposes in the animal economy.

The secretion of bile is continually going on, but it appears to be greatly retarded during the period of fasting and accelerated during the prehension of food, as has been shown by different experiments made by establishing a fistulous opening on the exterior. It was noticed that during the period of fasting there was scarcely any bile discharged, but upon partaking of food an abundance of bile was discharged in a very few minutes.

The purpose served by the secretion of bile may be said to be of two principal kinds: *Excrementitious* and *digestive.* From the peculiar manner in which the liver is supplied with much of the blood that flows through it, it is possible that this organ is excretory, not only for such hydro-carbonaceous matters as may need elimination from any portion of the blood, but that it serves for the direct purification of the stream which, arriving by the portal vein, has gathered up various substances which may need to be expelled almost immediately after their

absorption; it is easily conceivable that products may be taken up during digestion which are not only unfit for the purposes of nutrition but which would be positively injurious if allowed to mingle with the general mass of blood.

The liver, therefore, placed in the only course by which such matters can pass unchanged into the general current, may be supposed to guard jealously against further progress of effete matters and turn them back again into an excretory channel.

One chief function of the secretion of bile is the purification of the blood by ultimate excretion of effete matter; yet there are many reasons for believing that it is in the intestines where it performs its most important function in the process of digestion. In nearly all animals the bile is discharged, not through an excretory duct communicating with the external surface nor with a simple reservoir as most secretions, but it is made to pass directly into the intestinal canal, where it mingles with the chyme directly after the latter leaves the stomach, an arrangement the constancy of which clearly indicates that the bile has some important relations with the food with which it is thus mixed. A similar indication of its digestive properties is furnished by the fact that the secretion of bile is most active and the quantity discharged into the intestines much greater during digestion than at any other time, although this activity may, in part, be due to the fact that a greater quantity of blood is sent to the liver through the portal vein at this time, and that this blood contains some of the materials of the food absorbed from the stomach and intestines, which may need to be excreted either temporarily, to be afterwards reabsorbed, or permanently.

Bile is a somewhat viscid fluid of a yellow or greenish color. It has a strong, bitter taste, and when fresh has scarcely any perceptible odor; it has a neutral or slightly alkaline reaction; its color and degree of consistency vary considerably, apparently independent of pathological changes in the liver. The saline or inorganic constituents of the bile are similar to those found in most of the other secreted fluids; the neutral phosphates, carbonates of sodium and potassium do not exist in the fluid state, but are formed during the act of incineration and are found in the ashes. Oxide of iron is also said to be a common constituent of the ashes of bile; copper is usually found in healthy bile and always in biliary calculi.

Regarding the functions, the bile during digestion, it may be said that it assists in emulsifying the fatty portions of the food and thus render the latter capable of being absorbed by the lacteals. It has considerable antiseptic properties, and may prevent decomposition, putrefaction and fermentation of the food during its passage through the intestines. It also acts as a natural laxative by promoting an increased secretion of the intestinal glands and by stimulating the peristaltic action of the bowels, thereby assisting them in the propulsion of their contents.

Let us now for a moment consider in what manner we can arrive at a conclusion as to how we can account for the fact that intestinal disturbances are the result of morphological changes in the hepatic gland. As we have already stated, the liver is a very large organ, and has some very important functions to perform, of which, perhaps, the most important is the secretion of bile, a very essential substance in the process of digestion, and it is perfectly plausible that an insufficiency or a preponderance of this important fluid will and does at once lead to intestinal derangements.

Being fully cognizant of the fact that one of the chief functions of bile is to act as an antiseptic, by preventing the food with which it comes in contact from undergoing the processes of decomposition and fermentation, we can readily see that an insufficiency of this secretion will allow the ingesta or contents of the intestines to become septic, putrid or fermentative, a condition which is frequently demonstrated by the fœtid aroma which always attends the fæcal matter in these cases. Again, bile being a natural carminative, an insufficiency of it will frequently be shown in the so-called cases of flatulent colic, which formerly were supposed to be due simply to fermentation of the food. Bile also acts as a natural purgative by increasing the secretion of the intestinal glands; therefore, if the supply is curtailed we are pretty sure to have indigestion, constipation, etc., follow as a sequel. If, however, the supply is increased beyond normal we have, as a sequel, diarrhœa, and I might state in this connection that it is my opinion that a great many cases of chronic diarrhœa are caused by a preponderance of bile being thrown into the intestines, a condition which is due to an over-active liver. Bile acting as a local irritant stimulates peristaltic action of the bowels and increases

their vermicular motion, thereby propelling or forcing the food through their channel; knowing this fact, we can readily see why a lack of this natural irritant which produces peristalsis will be followed by torpidity, paralysis, impaction, inflammation and gangrene of the intestines.

While it is possible to attribute and perhaps trace all lesions of the intestinal tract to be due to a morbid liver, yet I do not wish you to think that I advocate this idea; for I am fully aware of the fact that there may be and are numerous diseases of the intestines which have no connection with, and are independent of, any pathological changes in the liver. But as there are so many intestinal disorders which are liable to follow hepatic disturbances, I would suggest that a very rigid examination of the liver be made when called upon to administer to any animal affected with any disease of the visceral organs.

In establishing proof or in substantiating the above statements, I will, with your kind permission, describe one of these particular cases which, in my estimation, have their origin in the hepatic gland. For instance, you are called to see a case which on your first examination may be in the recumbent position or stand in the corner of the stall, comparatively speaking, quietly, but upon closer examination, you will notice that from time to time he will look around at his flank, or elevate the head, and turn up the upper lip. If we now, supposing the animal to be lying down, make him get up, he will walk around the stall a few times and will apparently make attempts at intervals to urinate or to lie down again; finally, if he does not lie down, he will go into one corner of the stall and stand there for some time in an attitude apparently of repose. Upon still closer examination you will find the pulse running from forty to sixty, temperature one hundred and one to one hundred and two, the conjunctivæ will be of a dirty reddish-yellow color. If you now manipulate the mouth, you will find that the tongue and mouth have a furred and soapy feeling, and the breath has a sour, fœtid odor; upon auscultation at the flank you will notice an absence of borborygmus, which clearly indicates that there is an absence of peristaltic action of the bowels; upon percussion over the region of the liver (on the right side), the animal usually evinces pain. The fæcal matter passed is dry, hard and thickly covered with mucus, and is passed in small quantities; in some cases the

sphincter ani has lost its contractility, which leaves a permanent dilation of the rectum. If no relief be given, the animal will usually linger in this condition, apparently with no perceptible change, for from eight to twelve days, without any change for the worse, when enteritis sets in and the animal quickly succumbs to its fatal effects. If properly treated, however, a successful issue may be looked for in from three to five days.

Now, gentlemen, believing that all of you have from time to time been called to prescribe for similar cases, when you felt, as I have done on numerous occasions, that you were, if you will permit me to use a hackneyed expression, "at sea" regarding the particular lesions you are to prescribe for, and having this circumstance in mind, I conclude by presenting this matter before this honorable body, through whose experience and exchange of ideas, I can reach a conclusion as to what manner I can therapeutically prescribe for these cases, so that I can endeavor to remove the cause, and not, as I believe I have been doing heretofore, endeavoring to remove the effect.

SPOILS SYSTEM VERSUS VETERINARY MEDICINE.

By Dr. I. Newton Krowl,
Passaic, N. J.

In the past, when a number of progressive veterinarians would unite in the interests of organizing an association or society for the advancement of the profession in knowledge, ethics and protection to certain individuals, the most serious concern was apparently manifested in the adjustment of matters relating to the membership of non-graduates. They must *draw the line* somewhere. But certain practitioners were not to lose sight of their political welfare; rich plums were to be plucked in the Bureau of Animal Industry or in State veterinary positions. So the lines were drawn and adjusted accordingly in certain instances, and to be candid, they were not adjusted with indelible ink either, as can be testified to by many Boards of Censors. The rapid development of the roll of membership, as well as the good-will and political influence of the self-made veterinarian (by the way, the character of the job he made of himself did not count), would be more of a necessary assistance to these predominant spirits to reach the plums than a whole laboratory of veterinary knowledge.

Now on these *drawn lines* a number of the *actives* succeeded in reaching the supposed delicious fruit, but in many instances, sadness and even disgust was the outcome, for scarcely had they settled down to the feast, when we hear a wail of

protest at a system they forcibly helped to bring about in the selection and employment of veterinary officials by both Federal and State authorities. The inevitable came to pass. "As ye sow the seed, so shall ye reap." It is a sad condition of affairs, deeply regretted by every veterinarian of integrity, who is enthusiastically loyal to professional interests, that the spoils system has laid hold of the veterinarians' public work. I am sure that the profession in general, as well as the politician in particular, must know that certain ambitious wire-pulling veterinarians are to be blamed largely.

The true statesman and higher government officials may be honest and sincere in their endeavors to keep the unscrupulous politician's hands from manipulating so vital an issue as veterinary sanitary medicine, but the average political wire-pulling representative is a very shrewd individual. He very quickly judges of the integrity of a *reformer* very much by the company he keeps. The politician naturally asserts a right to utilize the political influence of the empiric from a standpoint of patronage, with as much propriety in the premises as have the regular veterinarians who are wire-pulling in the veterinary organizations for personal interests. Let us first make it untenable for undue political ambitions in our societies and frown on an unscrupulous mania for place-hunting, then we can safely and consistently petition the government to protect the grand work of our noble profession from the grasp of the patronage-seekers. As it stands at present, local politicians in particular simply "wink the other eye," while we protest.

An experienced politician, well-known in the inner circles of New Jersey's councils, very plainly informed me while in conversation on the subject recently, that the regular veterinarians of the State had ample opportunity to improve the standing of their profession through proper legislation within their society circles, without incessantly bothering the law-makers with overtures of inconsistent representations. This gentleman happened to be at a horse-trial several weeks ago, where he heard counsel interrogate a *veterinary expert*, part of which is as follows: Question—"Have you a diploma?" Answer—"Yes, sir." Question—"What college?" Answer—"The New Jersey Veterinary Medical Association." Such insolence! We all certainly admire and heartily encourage self-made veterinary practitioners, but not empirics, ignoramuses, men who are degrading our calling! Is it to be wondered that we have two State veterinary organizations in New Jersey?

The struggling, sincere and progressive practitioner cannot be expected to tolerate fraternal associations with the *self-made article*, the calibre of whom (a sample is noticed above), for surely they are of no benefit to any one, but to the unscrupulous ward politicians or their counterparts—the political wire-pulling practitioners. There are several of these worthy representatives or self-styled *graduates* of the New Jersey Veterinary Medical Association in my immediate neighborhood, and, consequently, I am often made to blush for the assaults made upon our professional dignity.

I was partly led to write these lines from the fact of reading an item under the heading of "Interesting Professional Items," in the February *Review*. The item stated that, "if the two veterinary associations of New Jersey were united, it would greatly strengthen the prospects of the successful agitation for better laws to govern tuberculosis among her cattle. Who will move first in the matter? Tuberculosis and its ravages among the bovines of New Jersey as in other States, and the

consequent dangers to public health, are certainly very important subjects to bring about prompt and proper action on the part of law-makers for the good of the people.

But how many of the politicians will certainly "wink the other eye" at the situation, and the company we keep? Let us be more honest and consistent, giving evidence of a concern for profession etiquette, and we surely will derive more esteem and consideration for our noble calling from both the law-makers and the general public in the future.

TWO EQUINE MONSTROSITIES.

By A. W. Bitting,
Purdue Experiment Station, Lafayette, Ind.

Two equine monstrosities, one five-legged and the other six-legged, occurred during the month of May near this place.

On the night of May 27, a large pouty mare, seven years old, gave birth to a foal with five legs, the fifth being attached to the head. The foal was of average size, good form and very lively. The fifth leg emerges from the body just above, and in front of, the left ear. In form, the superior portion resembles the scapula with its muscular coverings removed from its body. The remainder resembles the hough joint and all parts below. In direction, it proceeds backward and downward along the side of the neck until it makes its first joint, which is like the hough (hock), but flexed at an angle, of about one hundred and fifteen degrees, thus carrying the foot forward and a little below and behind the mouth. Its length is about two-thirds of that of the normal member.

The attachment is effected by a ligament and cartilage. The ligament seems to be continuous with that of the ligamentum nuchæ; the cartilage is a union of the cartilage of prolongation of the bone of the leg and that on the inner aspect of the base of the ear. The base of attachment is small and located over the parietal bone. It has great freedom of movement. Owing to the position in which the leg is carried, the left ear is bent downward.

The bones of the legs seem to be well formed. The first one bears the shape of the scapula as nearly as may be determined by examination and is well covered with muscles. A

number of small bones form what resembles a hock joint, the movement between these bones is quite limited, as is also that between these bones and the bone above. Between the former bones and the metatarsals there is a hinge joint with extensive movements. The joint corresponding to the fetlock has a movement transverse to the direction of the body. The bones enlarge to form the pastern-joint, but are anchylosed. The hoof is compressed laterally. A few ligaments and tendons cover the joints and bones below the first bone. No motion takes place in any of the joints except when the leg is thrown around by the movement of the head or body.

When the foal was born, the head was of good form, but it has been enlarging as in hydrocephalus.

The six-legged foal was born on May 12, and is from a large draft mare. The hind legs are double from the patella downward, but are covered by a common layer of the skin until they reach the first joint of the phalanges. The patella, tibia, tarsal and metatarsal bones are in part united on their joining sides. Some of the muscles and tendons also seem to be double. There is only one tendon of Achilles. On the right leg one of the feet turns squarely inward at the upper part of the lower third of the metatarsus. This foot does not rest upon the ground and interferes with locomotion. On the left leg the division is squarely at the phalanges and both feet rest upon the ground. The joints are capable of the ordinary movements, but in somewhat lessened degree. They are weak. The colt is very healthy and follows the dam.

EDITORIAL.

It is with some regret that we should perhaps give an apology in the editorial page to our subscribers in reference to the mailing of the last issue of the magazine. Unavoidable circumstances necessitated that it was sent to our readers later than we had anticipated, instead of at the first of the month, which it shall always be our desire to accomplish, if possible. Sometimes subscribers change their post-office address without giving us the proper notification. At other times, unavoidable obstacles are met in the editorial office which one cannot obviate. In fact, no one but those who have the actual experience can appreciate the manifold and complicated details in literary work which frequently cause unforeseen delay. The shoals are so numerous that one cannot help but strike one once in a while. Sometimes we receive promises which are only partially fulfilled or not at all. At any rate, let us say that every number will be issued as regularly as it lies in our power to accomplish it.

We also take pleasure to call the attention of the profession to two important veterinary conferences—the Pennsylvania State Veterinary Medical Association and the United States Veterinary Medical Association. The former will convene in Harrisburg in the early part of September. We appeal to every veterinarian in Pennsylvania to be present at this meeting. The veterinary profession of Pennsylvania is confronted by a great work during the next year—a work not for personal but for public good. Forces must be united, plans of procedure outlined and enthusiasm inspired. In order to do all this, we need the assistance and co-operation of every veterinarian and friend of the profession in the State. The unqualified success which it has met in the last few years and the good work which it has done, making its rank second to none in the list of State organizations, should secure a good attendance.

A few weeks later, a more important gathering of veterinarians, that of the United States Veterinary Medical Association, will be held in Philadelphia. This national body, which

represents the veterinary profession in this great country, is so well known that it requires no details of comment. Much is expected from this organization, much it is their duty to do, and invaluable is the work which it is capable of accomplishing. Let us all put our shoulder to the wheel, let us all drop in our grain of strength in order to ameliorate our great cause which devolves upon us.

President W. H. Hoskins has sent us the following communication :

The subject of "Tuberculosis" in at least three of its most important phases will be considered, respectively, by Dr. J. Faust, of Poughkeepsie, N. Y.; Dr. M. R. Trumbower, of Illinois, and Dr. Leonard Pearson, of Philadelphia.

"Psychology of the Domestic Animals," by Dr. Olof Schwarzkopf, will form a part of the program.

"Neurotomy as a Practical Operation," by Dr. S. J. J. Harger.

"The Influence of Ovariotomy in Regard to Lactation" will be treated of by Dr. F. H. Osgood.

Dr. W. L. Williams, of Montana, will read a paper reviewing the diseases of the Rocky Mountain regions, giving the peculiarities and modifications that are essentially due to their environments.

Dr. L. McLean has consented to offer a paper on "Horseshoeing."

The discussion of a "New Method of Treating Periodic Ophthalmia by Surgical Interference" will also be disposed of at this meeting.

Several other papers are under consideration and will be announced in the next number of the veterinary publications of this country.

ABSTRACTS.

DOUBLE GALL-BLADDER.

Berndt has seen a double gall-bladder in a cow. Each had its special ductus choledicus, which were united at their distal extremity at an acute angle.—*Ber. Thier. Woch.*

ABSENCE OF THE LACHRYMAL DUCT.

Brunet (*Le Progrès Vét.*) has observed, in a horse which was continually discharging tears from the eyes, an absence of both lachrymal ducts. According to him, this has never before been witnessed in the horse.—*Ibid.*

EPILEPSY DUE TO THE TÆNIA IN CATTLE.

M. Eggmann has seen a cow suffering from epileptic fits accompanied by fever, diarrhœa and straining.

Believing that he had to deal with traumatic pericarditis or some form of poisoning, the author instituted treatment, but without success. At the autopsy he found four tænia denticulata eight meters in length, which had caused lesions of entritis.—*Schweizer Archiv für Thierheilkunde.*

PREVENTIVE INOCULATION AGAINST ANTHRAX.

The following number of animals, with the percentage of mortality indicated, were inoculated at the Pasteur-Chamberland laboratory in Budapest. Of 1674 horses inoculated, four died from the effects, a mortality of .23 per cent; of 21,000 cattle inoculated, thirteen died from the operation, .06 per cent, and fourteen died from anthrax during the year; 72,500 sheep were inoculated; .43 per cent died from the immediate effects and .18 per cent from the disease during the year.—*Ber. Thier. Woch.*

OSTEOMA IN THE LUNGS OF THE OX.

A steer brought from the Argentine Republic to the market in Brussels furnished the following remarkable pulmonary lesions: The lung was emphysematous; at the level of the

posterior border of one lung there was a hard, resisting mass, of the volume of a fist, creaking on section with the knife, and presenting the physical characters of bone tissue. The histological examination verified the macroscopic aspect and established the diagnosis of osteoma. According to the reporter, this is the first known instance of a bone tumor in the lungs of the domesticated animals.—*Annales de Médecine Vétérinaire*, December, 1893.

TRANSMISSION OF CANCER FROM MAN TO ANIMALS.

M. Boinet has made sixteen inoculations of rats, guinea pigs and rabbits, with cancerous tumors taken from man, and has obtained the following results: One successful from forty intra-peritoneal injections in the rat. One successful in the rabbit after the subcutaneous injection of the juice of a lympho-sarcoma of the testicle. Finally, the third successful case from an injection of the same material in the pleura of an old rat. These are the positive results upon which the author bases the possibility of the transmission of cancer from man to animals.

M. Boinet has succeeded in the inoculation of cancer from the mammary gland of a dog into the peritoneum, and the subcutaneous connective tissue of several rats and guinea pigs and rabbits.

SUBCUTANEOUS SECTION OF THE APONEUROSIS OF THE FASCIA LATA.

M. Gavard reports a case in a draft mare which became lame in the posterior right member without any known cause. After several recurrences of the lameness, the mare was unable to move and could not flex the lame member. A very tense, fibrous cord could be seen extending from the haunch to the region of the patella, where it disappeared in a soft and limited swelling. The thigh appeared enveloped in an inextensible membrane situated under the skin.

The author diagnosed an aponeurotic retraction of the *fascia lata*, and, with a long blunt-pointed bistoury, made a subcutaneous section of this aponeurosis about fifteen centimetres in length.

The lameness disappeared immediately and did not recur. A few paints of the cautery completed the cure.—*Recueil de Méd. Vét.*

PERFORATION OF THE ŒSOPHAGUS.—A CLINICAL SIGN OF THIS ACCIDENT.

Veterinarians are frequently called to dislodge foreign bodies in the œsophagus of cattle, which have previously been treated by the owner, his neighbor or some empiric who has endeavored to give relief by the forcible use of any improvised bougie whatsoever. Perforation of the œsophageal wall is often the result of this maladroit treatment. According to M. Moraud, there is one symptom which permits one to make an almost positive diagnosis of rupture of the œsophagus—a voluminous emphysema of that region of the neck.

He cites three cases in which this symptom enabled him to confirm the existence of rupture of the œsophagus produced in this manner.—*Recueil de Médecine Vétérinaire.*

THE TRANSMISSION OF GLANDERS THROUGH THE DIGESTIVE APPARATUS.

M. Nocard has continued his experiments on this subject, and arrived at the conclusion that the alimentary canal is a very favorable seat for the entrance of the bacilli of glanders, and that most horses which suffer from this disease are infected in this manner.

M. M. A. Cadéac and Malet have experimented with the pus, the discharge and the tubercle of glanders, and have attributed the infection to the deposit of the virus upon a recent wound in the mouth or the pharynx. In the experiments of Nocard, the infection was probably due to the entrance of the bacilli through the intestinal mucous membrane. M. Decroix stated that he had at one time eaten with impunity meat of a horse suffering from glanders, and of a dog affected with rabies.—*Revue Vétérinaire.*

PARASITES IN THE TENDONS OF THE HORSE.

The first observation of the spiroptera reticula, which lives in the tendons of the horse, is generally attributed to Dr. Bleiweis,

of Vienna, but a communication by Ferguson relative to special lesions of the perforans tendon can be seen in the "Veterinarian" 1838, page 520. By examining, says this author, the portion of the tendon situated in the carpal and the metacarpal sheaths, he has found on several occasions cavities of variable dimensions in the substance of the tendon. The cavities surrounding the tendon generally communicated by an opening or a long canal with the interior of the sheath, and contained a large number of fragments of variable size, which on account of their form and of the manner in which they were coiled together could be easily mistaken for long, thin, yellow worms. After a careful examination, it was found by Rigot that the coiled-up masses in question were nothing else than the spiroptera reticula.—*Recueil de Médecine Vétérinaire.*

INFECTION OF THE FŒTUS BY THE MARE.

M. Pécus has made two observations which tend to corroborate the possibility of the infection of the fœtus in utero.

A mare, suffering from a benign form of glanders of the catarrho-bronchial type, aborted a fœtus seven months old. The autopsy showed that the lungs of the fœtus contained numerous whitish, hard granulations from the size of a millet seed to that of a pea, inclosing in their centre a small quantity of pus. Unfortunately, on account of the previous decomposition of the tissues, inoculations to prove the virulency of this pus could not be made.

A mare convalescing from an attack of infectious pneumo-enteritis aborted a fœtus about five months old in which the following lesions were discovered: Three-fourths of a litre of a reddish-yellow liquid in the abdominal cavity; intense congestion of the peritoneum and the intestines, points of well-marked softening in the liver, and numerous points of congestion on the surface and in the interior of the lungs; effusion into the thoracic and pericardial cavities containing numerous round and dumb-bell-shaped microbes. These lesions presented the greatest analogy with those of infectious pneumo-enteritis, and in the opinion of the author demonstrate the possibility of transmitting this disease from the mother to the fœtus.—*Journal de Méd., Vét. et de Zootech.*

CHRONIC LAMENESS IN A HORSE CAUSED BY THE SPIROPTERA RETICULA.

M. Conte reports a case of chronic lameness in a fifteen-year-old horse which suddenly became lame in the left anterior member. The lameness, which was attributed to a traumatism, resisted all means of treatment. A seton was applied over the shoulder without success. Professor Mauri, of the Veterinary School of Toulouse, observing the peculiar manner of placing the diseased member upon the ground, located the lameness in the metacarpal region which was the seat of a splint and exaggerated sensibility.

The splint was fired but the lameness continued to increase. The parts were re-cauterized, but with the same success. The horse finally became useless and was slaughtered. A careful dissection of the parts revealed the following alterations:

1. An old splint on the posterior border of the internal rudimentary metacarpal bone.

2. Chronic inflammation of the suspensory ligament of the fetlock.

3. Multitudes of spiroptera reticula invading the substance of this ligament.

The suspensory ligament was of a yellowish-gray color. A transverse section showed numerous whitish coiled-up filaments which were nothing else than these spiroptera. Professor Neumann, who made the examination and the diagnosis, easily recognized them as the spiroptera reticula.

Observations similiar to those witnessed by M. Mauri have been made in France, especially at Alfort, during a number of years, but this is the first instance of an incurable case of lameness caused by these helminths located in this ligament. M. Mauri's case was especially interesting, and a diagnosis difficult from the absence of any external deformity in the ligament. The treatment, of course, was necessarily futile.—*Revue Vétérinaire*, November, 1893.

DIAGNOSIS OF TRAUMATIC PERICARDITIS.

The prompt and positive diagnosis of the penetration of a foreign body into the heart and the pericardium is a matter of primary importance both to the proprietor and the veterinarian.

According to M. P. Moulis, among the numerous signs on which such diagnosis may be based, there is one which is paramount above any of the others. It is the attitude of the animal. At the precise moment when the foreign body enters the rumen and the pericardium, it may be difficult to make a positive diagnosis ; but as soon as the heart becomes involved the patient takes a remarkable attitude in the standing position.

On entering the stable, if the animal be on his feet, one will see that the head and neck are extended, the elbows separated from the thorax, the anterior members scarcely under the body and the posterior members placed well under the abdomen.

This characteristic position, with the anxious expression of the patient, the dyspnœa, but an absence of cough, permits one to conclude without touching the animal, that there is a lesion of the heart.

In peritonitis the animal may have a similar attitude, but the excrements and the manifestation of pain on palpating the abdomen remove all doubt. Symptoms which at first may be mistaken for indigestion or enteritis are due to the passage of the foreign body through the rumen and the diaphragm ; but as soon as the heart is affected, the patient assumes the characteristic attitude.

M. Urbain André says : "If one observes in a bovine great acceleration of the heart beats, augmented on exercise and becoming vibrating ; if the animal refuses to move and shows more or less rigidity of the trunk ; if he refuses to make lateral displacements ; if he yields to the pressure of the hand over the xiphoid cartilage or on the left side of the thorax over the region of the heart, especially during expiration ; if the respirations are painful and of a pronounced pectoral type ; if there is no infectious disease or disease of the digestive apparatus which might cause the cardiac alterations ; if there is no pulmonary affection to explain the respiratory symptoms ; then one is justified to conclude that the lesion is one of the pericardium of the heart, in spite of the absence of symptoms characteristic of traumatic pericarditis or myocarditis."—*Recueil de Médecine Vétérinaire.*

THERAPEUTIC NOTES.

THE TREATMENT OF HERPES TONSURANS IN THE HORSE.

Forie and LeCalvé highly recommended Dr. Cutler's mixture in the treatment of this disease:

Acid. carbol. cryst.	aa
Tinct. Iod.	
Chlor-Hyd.	

The hairs over the affected parts are cut off or shaved and the mixture applied with a pencil, great care being employed that it be not brought in contact with the healthy skin. In a short time an inflammatory swelling forms at the point of application. The epidermis becomes exfoliated in a few days and healthy skin forms underneath. The new hairs over this spot are usually of a darker color. As to the ingredients of this mixture the carbolic acid is caustic and antiparasitic. The iodine has a similar action and is a solvent for the carbolic acid; while the chloral-hydrate by its anæsthetic properties neutralizes the pain.—*Recueil de Médicine Vétérinaire*, 1894.

THE TREATMENT OF GOITRE IN THE HORSE.

M. G. Chénier, military veterinarian, has at different times expressed the opinion, which was met with considerable opposition, that the thyroid bodies are annexed to the skin and that there is a close relationship between the circulation of the skin and that of the thyroid body. The ligation of its vessels has no influence upon the health of the individual, although its total extirpation is followed by irremediable consequences. His conception of the thyroid circulation thus led him to experiment with phenic acid, in respect to its ischaemic action upon the skin, in order to effect an atrophy of the thyroid body. In 1892 he has been enabled to produce successfully in three or four cases atrophy of these organs. In July 1886, he treated a bay gelding with a double goitre. The tumor was as

large as a fist. The resolution of the tumor was obtained in three days after two applications of the phenic acid. On the the 5th of last September, he treated a twelve-year-old mare, also suffering from cystic goitre. Applications of phenic acid were made after some days. The tumor diminished in volume but resolution was only obtained after operative measures. When the application of commercial phenic acid is made with care no bad results need be feared. The skin becomes hardened but not gangrenous. The pilous follicles are not destroyed; only the epidermis is exfoliated after a certain time. It determines nevertheless a sufficient diminution of the vitality, in order to produce atrophy of certain subcutaneous tumors.—*Revue Vétérinaire*, July 1894.

THE TREATMENT OF IMMOBILITY OR DUMMINESS BY THE SUBCUTANEOUS INJECTIONS OF NITRATE OR HYDRO-CHLORATE OF PILOCARPINE.

The author in presenting a memoir, discussed before the Central Society of Veterinary Medicine of Paris, recommends M. Racca's treatment of immobility with nitrate or hydrochlorate of pilocarpine injected subcutaneously and gives a number of cases indicating his results.

Case 1.—Treated in 1892 for five days. The animal received daily fifty centigrams of pilocarpine, gradually increased to seventy centigrams on the fifth day. The following five days the animal received thirty grams.

At the end of this time the horse had made a good recovery.

Case 2.—Horse received daily subcutaneously sixty centigrams of hydrochlorate of pilocarpine for two days. After the second injection the appetite was improved, and the animal was brighter and more active. After the third injection treatment was abandoned and the horse recovered.

Case 3.—After some preparatory treatment the patient received on the first day eighty centigrams of hydrochlorate; the second day, seventy centigrams; the third day, eighty centigrams. After the second injection the amelioration was marked, which continued after the third. On the ninth day after the injection the animal had completely recovered.

Case 4.—Seven year old mule suffering from brain trouble, the result of heat, and treated for the same unsuccessfully. The author administered the first day sixty centigrams; second, sixty-five; the third and the fourth, sixty each; and on the sixth, fifty centigrams of the pilocarpine salt. Improvement rapidly followed, and eight days after the commencement of the treatment the animal was discharged cured. The committee recommend that this treatment merits to be repeated by other veterinarians, but M. Cagny expresses some doubt as to whether these cases were suffering from immobility in its genuine form.—*Recueil Médecine Vétérinaire.*

PROCEEDINGS OF SOCIETIES.

PHILADELPHIA SOCIETY OF VETERINARY MEDICINE.

The regular annual business meeting of the Philadelphia Society of Veterinary Medicine was held on July 11, 1894, at the University of Pennsylvania.

In the absence of reports of committees, the society, on motion of Dr. Ridge, at once proceeded to the election of officers. According to the by-laws, Dr. Conrow as vice-president, succeeded to the presidency. In addition the following officers were elected to serve for the ensuing year: Vice-President, Dr. M. E. Conard; Secretary, Dr. William Tag; Treasurer, Dr. William L. Zuill. Board of Trustees: Drs. Ridge, Rodgers, Williams, Schreiber, Pearson. Librarian, Dr. Harger.

The election of a recording secretary was laid over until the next meeting and Dr. Tag was requested to act as general secretary until one is elected.

The application of Clarence J. Marshall was received and will be acted upon in the usual manner.

After quite a lively discussion on the merits and demerits of a State examining board, the society adjourned to meet again at the same place on August 8. The essayists for this meeting will be Drs. Conard and Ridge, who will present valuable and interesting papers; also reports of cases are promised by Drs. Conrow, Harger and others.

WILLIAM TAG, *Secretary.*

ANNUAL COMMENCEMENT OF THE VETERINARY DEPARTMENT OF THE UNIVERSITY OF PENNSYLVANIA.

The eighth annual commencement of the Veterinary Department of the University of Pennsylvania was held, in conjunction with that of the Medical and Dental Departments, in the American Academy of Music, Philadelphia, at 11 a. m., on June 7, 1894.

The valedictory address was delivered by Dr. Lewis Starr. After the usual ceremonies, Provost Pepper conferred the degree Doctor of Veterinary Medicine (V. M. D.) upon the following members of the graduating class:

Frank H. Andrews, Syracuse, N. Y.; Horace G. Black, Hammonton, N. J.; John Morris Carter, Chatham; Thomas Castor, Frankford; Calvin C. Cole, Dover, Del.; G. Walter Dilkes, Barnesboro, N. J.; James Fairley, Philadelphia; Clyde Evert Fouse, Philadelphia; G. Walton Gray, Philadelphia; L. Kenneth Green,

Booth's Corner; Joseph P. Grogan, Baltimore, Md.; Samuel G. Hendren, Roxborough; Edward L. Kellner, Philadelphia; Emil Knight, Rochester, N. Y.; Clarence J. Marshall, Rome; Enoch H. Moore, Bridgeton, N. J.; John J. Rectenwald, Pittsburgh; A. G. G. Richardson, Ithaca, N. Y.; Arthur Salinger, Philadelphia; Frank T. Shannon, Lexington, Ky.; George K. Swank, East Mauch Chunk; Harvey J. S. Weicksel, Line Mountain.

A meeting of the alumni was held at the Veterinary Department at 3 o'clock in the afternoon, where a few papers were read and several items of interest relative to the welfare of their *alma mater*, which had just passed the first decade of its existence, were discussed.

The annual alumni banquet and dinner took place in the evening at Reisser's Hotel. Covers were laid for about fifty. A list of toasts responded to by members helped to enliven the occasion.

MASSACHUSETTS VETERINARY ASSOCIATION.

The regular monthly meeting of the Massachusetts Veterinary Association was held at No. 19 Boylston Place, on Wednesday, March 28, 1894, at 7.30 p. m.

The members present were Drs. Becket, Blackwood, Burr, Howard, Labau, Marshall, Osgood, Parker, Rogers, Skelly and Winchester.

The minutes were then read and accepted. Reports of committees:

Dr. Osgood, as one of the committee on tuberculosis, reported that he had interviewed some of the prominent medical men, and most of them seemed to think it would be better to postpone the meeting until fall.

The secretary said he had spoken to several prominent physicians. All had expressed interest in the movement and one or two had promised to be there and take part in the discussion.

Dr. Burr reported that he had seen Drs. Ernst, Councilman Abbott, of the State Board of Health, Durgin, of the City Board of Health, and others; they had all promised to be present and take part in the discussion.

Dr. Winchester then moved that the report of the committees be accepted as one of progress. Seconded by Dr. Rogers. Carried.

New Business.

The secretary asked those members who are in arrears with their dues to remember that it is nearing the end of the session, and there are still quite a number unpaid.

It was also suggested that the members should endeavor to get all reputable graduates in the State to become members.

May Meeting.

Dr. Howard said certain gentlemen had been asked to take part in the meeting to be held in May. The members ought to be prepared to do the subject justice, and he thought the members ought to introduce the subject.

After some further discussion, Dr. Winchester moved that one or more members of this association should be appointed to open the meeting. The subject to be divided into parts or sections, each section to be taken by a member of the association; the time to be limited to ten minutes. Seconded by Dr. Osgood.

Dr. Rogers moved that the arrangements should be left to a committee of five, including the present committee, with two additional members to be appointed by the chair. Seconded by Dr. Osgood, and carried unanimously.

The chair then appointed Drs. Peters and Howard as the additional members on the committee of arrangements.

Dr. Winchester informed the meeting that the Comita minora of the U. S. V. M. A. will meet during the first week in April. The principal business will be the selection of a place for the annual meeting. He then asked the members what their choice would be between Cleveland, Columbus, Cincinnati, Buffalo, New York and Philadelphia. Philadelphia received the unanimous vote of the members present.

ANNUAL MEETING OF THE MASSACHUSETTS ASSOCIATION.

Dr. Osgood moved that the annual meeting be held at Young's Hotel and that a committee of three be appointed to arrange for the dinner, etc. Seconded by Dr. Winchester and carried unanimously.

Dr. Howard suggested that Drs. McEachran and Wyatt Johnston of Montreal, Drs. Hoskins and Pearson of Philadelphia, Dr. Liantard of New York, Dr. Smith of Toronto, and Professor Stockbridge be invited to attend the dinner.

The chair appointed Drs. Osgood, Winchester and Becket on the dinner committee.

Dr. Rogers then communicated the fact to the association that Dr. John Saunders was very low and was not expected to recover. All business was then stopped while a message was sent to his house inquiring for him, and after hearing that he had had a third hemorrhage and was very low, the meeting adjourned.

JOHN M. PARKER,
Secretary.

VETERINARY ASSOCIATION OF THE DISTRICT OF COLUMBIA.

At a meeting of the Veterinary Association of the District of Columbia, held on June 30, 1894, the following preamble and resolutions were unanimously adopted:

WHEREAS, On account of the present and constantly increasing number of institutions teaching the science of veterinary medicine and the marked tendency of many of them to require but a short and insufficient period of study and attendance; be it

Resolved, That the members of this association are in full accord with any provisions which will remedy the evil of short-term schools and their injurious effect upon the veterinary profession;

Resolved, That a uniform standard of time and other requirements should be established and recognized. The term of attendance not to be less than five (5) months for three years. The requirements and branches to be taught should be decided upon by a board composed of one representative from the veterinary faculty of each institution wherein the science is taught;

Resolved, That should the foregoing seem impossible of conception, then that a national board of examiners, composed of one delegate from each State Veterinary

Society, should propound a number of examination questions to be changed yearly and to be used by the State board of examiners, who shall sit at a specific time and place to examine any graduate of veterinary medicine who may appear before them. Said board to be elected by the State Society;

Resolved, That the various State legislatures should be asked to co-operate with said boards of examination and enact laws making it unlawful to practice veterinary medicine without a certificate of examination from said board of examiners.

ACHESON,
D. E. B. *Secretary.*

On motion of Dr. Osgood the foregoing was received and spread upon the minutes.

CALIFORNIA STATE VETERINARY MEDICAL ASSOCIATION.

SAN FRANCISCO, CAL., June 13, 1894.

A regular meeting of the California State Veterinary Medical Association was held on the above date at the Baldwin Hotel, San Francisco, Cal.

The meeting was called to order by the president, Dr. H. A. Spencer.

Upon roll call the following gentlemen answered to their names: Drs. Whittlesey, Fox, Spencer, Sr., Spencer Jr., Forrest, Egan, Robin, Williams, Hogarty, Pierce, Eddy, Maclay, Jackson, Orvis and Archibald. Visitor, Dr. T. T. Trombly, Logan, Utah.

Under the head of reports of the Board of Examiners, Committees, etc., the Board of Examiners reported favorably on the name of F. Forrest, and recommended that he be admitted to membership. The committee on certificates made their report, which was accepted upon motion and the committee discharged. The committee on legislative matters reported that they had attended the State Sanitary Convention held in San Jose, and they expressed the belief that they had accomplished a great deal toward the elevation of the veterinary profession by so doing. They also stated that they were treated very courteously on that occasion by the members of the medical profession who were present at the convention.

Under the head of admission of new members the secretary moved that Dr. F. Forrest, of San Jose be admitted to become a member of the association; the motion was seconded by Dr. Fox and carried.

Under the head of reading of papers, discussions, etc., Dr. D. F. Fox, of Sacramento, read a very original and instructive paper on "Diseases of the Liver as a Direct Cause of Intestinal Disturbances." The president called upon Dr. Spencer, Jr., to open the discussion, which he did by saying that he had been called upon to treat a great many cases such as described by the essayist, and he fully concurred with the essayist in that the primary lesions in these cases are to be found in the hepatic gland in the majority of cases. The discussion was also participated in by Drs. Orvis, Whittlesey, Maclay, Twombly, Archibald and Egan. They all complimented the essayist on the originality of his remarks. Some of the members, however, did not agree with the essayist, and stated that it was their

opinion that if there was liver disease present in these cases, it was purely a secondary lesion. Dr. Egan mentioned a very interesting case in which the cause of death was due to hepatic lesions. Dr. Spencer, Jr., said that he had treated the disease with aloin followed by tonics with good success. The secretary stated that he had treated these cases with drastic purgatives without success, but since he had applied treatment toward the amelioration of hepatic derangements, he had quite a decrease in the mortality of the cases he was called upon to treat.

Dr. Whittlesey said he had held post-mortems on several of these cases without discovering any changes in the hepatic gland.

The president closed the discussion with a few well chosen remarks. He said this was a subject which should receive a great deal of attention at our hands. He believed that there were a great many cases of intestinal disturbances due to hepatic lesions. In closing his remarks he stated that he thought that we were as an association very fortunate in having a membership of gentlemen who were particularly desirous of introducing at our meeting subjects of which very little was known, in order that in the exchange of ideas which follows the reading of the papers, points would be raised which would lead us or enable us to treat these cases on a more scientific basis.

Dr. J. H. Eddy, of Stockton was then called upon to entertain the meeting, which he did by reading a very practical thesis on "Tetanus." It was followed by an animated and lengthy discussion, which was confined principally to the etiology of the disease. The following gentlemen participated in the discussion: Drs. Spencer, Jr., Whittlesey, Archibald, Orvis, Fox and Pierce.

Dr. Forrest was called upon to read a paper on "Springhalt." The essayist, without going into the pathology of the disease, described a case which he had treated, and in which he performed a cure by performing the operation known as perineo-prephalangeal tenotomy. The discussion that followed was participated in by Drs. Maclay, Whittlesey, Spencer, Jr., Twombly, Archibald and Egan.

The president closed the discussion by a few appropriate remarks.

On motion by Dr. Whittlesey a vote of thanks was tendered the essayists for the able and masterly manner in which they had entertained the meeting.

Dr. Twombly was requested to give an account of a few experiments he had made with tuberculin, in Utah, a request which he cheerfully complied with.

The secretary proposed the name of J. H. Edmons, of Los Angeles, for membership; the name was referred to the Board of Examiners.

On motion by the secretary the time of meeting was changed from 7.30 p. m. to 2.00 p. m., in order to accommodate the country members.

The secretary gave notice that at the next quarterly meeting he would move to amend the by-laws, regarding the place of meeting; the matter was referred to the Board of Directors.

The president appointed the following named gentlemen as essayists for the next meeting: Drs. Egan, Skaife and Hoggarty.

The following bills were ordered paid: R. A. Archibald, $8.75 for secretary's supplies; J. J. Evans, $15 for certificates; J. A. Cowen, $60 for printing pamphlets.

The secretary presented a communication from the secretary of the United States Veterinary Medical Association regarding the possibility of having some representative at the next meeting of the national organization.

Dr. Robin spoke on the use of yucatol in the treatment of fistulæ, cancers, etc., and he presented each member a sample package.

There being no further business to come before the meeting it adjourned to meet in San Francisco, September 12, 1894.

R. A. ARCHIBALD, D. V. S.,
Secretary.

Sacramento, Cal.

CONGRESS OF VETERINARY COLLEGES OF NORTH AMERICA,

Convened under the auspices of Committee of Congress of Colleges of the United States Veterinary Medical Association, held at the Genesee House, Buffalo, N. Y., Saturday, July 14, 1894.

The meeting was called to order at 12 noon, Dr. W. Horace Hoskins, Chairman of Committee, presiding.

The following members of the committee present: Drs. W. Horace Hoskins and A. W. Clement.

Delegates from colleges present: Harvard, Drs. Charles P. Lyman and F. H. Osgood; New York College, Drs. H. D. Gill and J. H. Huddleston; McKillup, Dr. Schwarzkopf; U. S. College (Washington), Dr. C. B. Robinson; University of Pennsylvania, Dr. J. W. Adams, and Kansas City College was represented by Dr. Hoskins as delegate, per instructions from said school.

Dr. Nelson P. Hinkley, of Buffalo, was appointed by Chairman Hoskins to act on the committee in place of Dr. C. C. Lyford, absent.

The following recommendations were adopted by the Congress of Faculties:

1.—Length and Number of Sessions.

That it is the sense of this meeting that hereafter all veterinary schools issuing diplomas shall require attendance on a course of instruction extending over three years of not less than six months each, the time to be counted from the commencement to the end of the actual instruction given in each year, exclusive of time devoted to final examinations, and that no diploma shall be issued to any candidate until he has complied with all such requirements.

2.—Matriculation Examination.

That the first four sections on page 405 of the Harvard announcement, under the head of admissions, be recommended for adoption; (1) that "each applicant will be required to read aloud a selected passage from ordinary English prose; (2) to write legibly and correctly an English composition of not less than 200 words; (3) to write English prose from dictation, and (4) the simple and compound rules of arithmetic, including decimal fractions."

3.—Preservation of Matriculation and Examination Papers.

Moved that we recommend to the Committee of the United States Veterinary Medical Association that all colleges be instructed to retain and preserve for the period of six months all examination papers, and that they be open for inspection by any properly constituted board.

("The final examination in any subject, or division of a subject of the course as given in the school.")

4.—Uniform Title.

That the further consideration of the question of a uniform title be laid upon the table for future consideration. Amended, that this subject is not to be taken up for discussion until after six months' notice of that coming discussion has been given to all the schools.

5.—Number of Veterinarians on Teaching Staff.

That it is the sense of this Congress that there should be at least four veterinarians attached to the teaching staff of all veterinary schools issuing diplomas.

6.—Association of Veterinary Faculties.

For the purpose of encouraging a closer and better acquaintance among the members of such faculties, and of offering to them a chance for an exchange of views regarding the better methods of education, moved that an association, to be known as the Association of Veterinary Faculties of North America, be organized here, and that temporary officers be elected to serve until the first regular meeting, which shall be held in Philadelphia the third Monday in September, when permanent officers shall be elected.

Dr. Charles P. Lyman was elected president pro tem. of this association, and Dr. Schwarzkopf, secretary pro tem.

Recommendations Offered by Association of Veterinary Faculties.

1. Dr. Osgood moved that a committee be appointed to draw up a constitution and by-laws at the next meeting.

Committee elected Dr. Schwarzkopf, chairman, Drs. F. H. Osgood and J. W. Adams.

2. Moved by Dr. Gill, seconded by Dr. Adams, that the committee on constitution and by-laws be instructed to draft and send a proper letter to the faculties inviting them to attend the next meeting of the Association, and stating the objects of the Association.

3. Moved by Dr. Osgood, seconded by Dr. Robinson, that the committee appointed by the United States Veterinary Medical Association to convene this Congress be invited to be present at the first meeting of the organization, in Philadelphia.

4. Moved by Dr. Osgood, that this body extend a vote of thanks to the committee of the United States Veterinary Medical Association for their attendance here and the work they have done in bringing about this Congress.

5. Moved by Dr. Hoskins, representing the Kansas City Veterinary College, that this Association asks at the hands of the United States Veterinary Medical Association an expression of opinion as to what disposition they would make of an applicant for admission, who had elected upon entering the college to take a three years' optional course in a two years' school, as to whether such candidate would be eligible to membership in that Association.

MISCELLANEOUS.

The report of the Veterinary Congress at Chicago will emerge from the printer's hands in a few days.

Fistulous withers seems to prevail through some of the northwestern States almost in an enzootic form.

Quite a struggle for appointment to the Ohio State Board of Veterinary Examiners is now being waged.

Professor A. Smith, of Toronto, has sailed for Europe. Berlin, Germany, being his point of destination.

Glanders in Montana is said to assume in a great majority of cases a very mild form. Hence its prevalence.

John W. Gadsden, M. R. C. V. S., of Philadelphia, sailed for Europe on the twentieth of June, to remain abroad until October.

An interesting case is pending in the Philadelphia courts as to how far a predisposition may be considered in the light of an unsoundness.

Some ten veterinarians have been attending the medical colleges of Philadelphia this winter for the purpose of gaining the M. D. degree.

Rumor has it that the McKillup Veterinary College of Chicago will establish a three-years' course at the opening. This will be gratifying news to the profession.

Application has been made to the railroad associations for the usual reduced rates to the annual convention of the U. S. V. M. A., at Philadelphia, in September next.

Professor Schwarzkopf, late of Minnesota, has taken the Deanship of the McKillup Veterinary College at Chicago. This insures a strong outlook for higher education in this direction.

The many friends of Veterinarian Weber, of Lancaster, will regret to learn of his serious illness and his compulsory retirement from practice to enter St. Joseph's Hospital of his own city for treatment of his injured knee joints.

Owing to ill health and the climate of Chicago, Professor Withers, one of the joint owners of the Chicago Veterinary College, has sold his interest to the other trustees and purposes making his future home in California.

The action of the Philadelphia Board of Health in quarantining the milk from adjacent counties on account of the prevalence of tuberculosis has found much adverse criticism and the dairy owners are ill prepared for such a radical measure.

The present plan of giving certificates of health and freedom from tuberculosis by only physical examination is fraught with great danger and may prove a very serious obstacle to future police arrangements to accomplish a thorough eradication of tuberculosis.

McKillip Veterinary College,

CHICAGO.

The course of instruction commences in October and extends over three years, with six months' duration. The course is based on a broad and scientific curriculum. It affords students the advantage to observe and work in the routine business of the largest practice in this country.

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THE
VETERINARY MAGAZINE.

VOL. I. AUGUST, 1894. No. 8.

TUBERCULOSIS AT THE WISCONSIN EXPERIMENT STATION.

BY H. L. RUSSELL AND W. G. CLARK.

During the winter of 1894, a few injections were made with tuberculin upon the station herd at the Wisconsin Agricultural Experiment Station as a demonstration to the course students of the value of the test for diagnostic purposes. At the time the test was proposed, the station herd was supposed to be in good condition. There had been no deaths for nearly two years and in no case had tuberculosis ever been suspected. The preliminary inoculation of a few animals with tuberculin showed that the disease was present in the herd to a considerable extent, so much so, that it was deemed advisable to examine the whole herd thoroughly. The following pages give the results obtained and are worthy of careful study as the epidemic in question was more than usually severe.

Primarily, it was intended to make a comparative test of the tuberculin prepared by the Bureau of Animal Industry at Washington with that imported into this country from Germany. Inability to secure enough of the imported lymph to make inoculations on the whole herd with doses of regulation amount frustrated in part this plan. Double inoculations, however, were made upon a number of the animals, a much smaller dose than usual of the imported tuberculin being administered. While the results obtained cannot be used as a test of the comparative value of the two brands of tuberculin, they may be, nevertheless, of some interest as they indicate that much smaller doses than are ordinarily used suffice to produce the desired action for the primary inoculation of an animal.

Before the herd was inoculated with tuberculin, a physical examination was made by one of us (C.) on eighteen of the adult animals. The following tables give a résumé of the temperatures taken before and after each inoculation :

TABLE 1 A.—Temperature Records of Station Herd taken Previous to First Inoculation with Tuberculin.

No.	Name.	Breed.	4 P. M.	6 A. M.	8 A. M.	12 M.	4 P. M.	8 P. M.	Average normal temperature.	Date of inoculation.	Amount and kind of tuberculin.	Weight of animal.
1	Polly	Grade Jersey			101.3	101.8	101.6	101.	101.42	10 P. M., Feb. 20	2 cc., Bureau	776
4	Gay	Jersey			101.	100.9	101.3	101.	101.05	" "	2 " "	871
9	Daisy	Grade Jersey			99.6	101.2	101.4	101.2	100.85	" "	2 " "	778
2	Bessein	"	101.8		101.6	101.4	102.		101.70	" "	2 " "	992
3	Doubtful	"	101.5		101.6	101.4	101.2		101.42	5 P. M., Feb. 23	2 " "	952
5	Aaggie	Holstein	101.1		101.7	101.	101.3		101.28	" "	2 " "	1017
6	Galena	Grade Jersey	101.2		102.2	100.4	101.		101.20	" "	2 " "	978
15	Melvina	Short Horn	101.8		102.1	102.	102.		101.97	" "	3 " "	1280
16	Miss Cowslip 6th	"	101.		101.8	100.8	101.6		101.30	" "	2.75 cc, "	1317
7	Rue	Jersey	103.3	101.4		99.4	100.		101.25	" "	.03 cc., Imported	980
8	Neth. Nugget	Holstein	100.2	100.6		100.4	101 7		100 73	4 P. M., Mar. 13	.0375 " "	1122
10	Bunn	Gr. Holstein	102.3	102.2		101.8	102.		102.08	" "	.0375 " "	1260
11	Beauty	Native	101.1	101.2		99.6	101.6		100.88	" "	.03 " "	1120
12	Bessie, 2d	Grade Jersey	102.	102.		100.4	101.8		101.55	" "	.025 " "	930
13	Palmyra	"	101.2	101.7		100.6	101.6		101.28	" "	.025 " "	906
14	Pansy	"	102.3	102.		101.6	101.9		101.95	" "	.025 " "	816
17	Clothilda Rosa	Holstein	103.	104.		101.7	104.9		103.40	" "	.03 " "	1077
18	Colantha Rosa	"	102.1	102.1		102.	102.1		102.08	" "	.03 " "	933
19	Experimentalist	Jersey, male	101.1	101.5		101.	102.		101.40	" "	.0375 " "	1336
20	Lady Mosscoat	Short Horn			102.	102.1	101.8		101.95	5 P. M., May 2	.03 " "	1022
21	Melrose	"			101.8	101.4	101.9		101.75	" "	.0225 " "	830
22	Pet	Ayrshire			102.1	102.5	101.9		102.12	" "	.0225 " "	684
23	Galatea	Grade Jersey				102.8	102.7		102.75	" "	.0125 " "	400
24	Melnotta	Short Horn				102.8	102.8		102.80	" "	.0125 " "	295
25	Rosette	Grade Jersey				102.4	102.3		102.35	" "	.0125 " "	275
26	Nugget	Holstein				102.8	102.9		102.85	" "	.0125 " "	456
27	Blossom	Grade Jersey			102.9	101.6	102.5		102.45	" "	.015 " "	366
28	Augustus	Holstein			102.5	101.8	102.5		102.32	" "	.019 " "	678
29	Chloe	"				102.7	102.3		102.45	" "	.0125 " "	340
30	Josephine	Grade Jersey			102.4	101.9	102.5		102.35	" "	.011 " "	184

TABLE 1 B.—Temperature Records of Station Herd Subsequent to First Inoculation with Tuberculin.

No.	Name.	Average normal temperature.	6 hours.	8 hours.	9 hours	10 hours.	11 hours.	12 hours.	14 hours.	16 hours.	18 hours.	20 hours.	24 hours	28 hours.	40 hours.	Reaction above average normal.	Reaction above highest normal.
1	Polly	101.42	. .	. .	103.9	. .	104.9	106.	*106.2*	105.4	105.	105.4	. .	. .	. .	*4.8*	*4.6*
4	Gay	101.05	. .	. .	101.7	. .	102.7	103.9	*104.4*	104.	102.5	101.5	. .	. .	. .	*3.4*	*3.1*
9	Daisy	100.85	. .	. .	102.4	. .	*103.8*	95.5	100.6	102.4	102.4	101.5	. .	. .	. .	*3.0*	*2.4*
2	Bessein	101.70	. .	102.3	. .	102.7	. .	103.3	103.2	103.3	102.6	102.4	. .	. .	. .	1.6	1.3
3	Doubtful	101.42	. .	101.2	. .	101.5	. .	101.9	102.3	103.1	102.4	101.6	. .	. .	. .	1.7	1.5
5	Aaggie	101.28	. .	102.8	. .	104.	. .	105.2	*105.6*	104.6	103.8	102.3	. .	. .	. .	*4.3*	*3.9*
6	Galena	101.20	. .	101.8	. .	102.4	. .	103.4	104.2	*104.9*	103.7	103.7	. .	. .	. .	*3.7*	*2.7*
15	Melvina	101.97	. .	105.2	. .	*106.4*	. .	106.3	105.6	106.4	105.	105.1	. .	. .	. .	*4.4*	*4.3*
16	Miss Cowslip	101.30	. .	101.6	. .	102.	. .	102.2	102.5	102.5	101.8	101.9	. .	. .	. .	1.2	0.9
7	Rue	101.25	101.2	102.2	. .	101.5	.	102.8	101.2	. .	101.6	98.7	102.	. .	. .	1.6	1.4
8	Neth. Nugget	100.73	101.7	102.	. .	101.9	. .	102.1	102.4	. .	*103.5*	101.8	102.4	. .	. .	*2.8*	*1.8*
10	Bunn	102.08	101.6	101.4	. .	101.4	. .	101.6	101.5	. .	102.7	102.1	102.7	. .	. .	0.6	0.4
11	Beauty	100.88	100.6	101.2	. .	101.2	. .	101.3	101.6	. .	102.5	101.	101.9	. .	. .	1.6	0.9
12	Bessie 2d	101.55	101.6	101.7	. .	101.4	. .	102.1	102.1	. .	*104.6*	103.2	102.5	. .	. .	*3.1*	*2.4*
13	Palmyra	101.28	102.	101.6	. .	101.7	. .	102.3	103.2	. .	*104.9*	102.4	102.2	. .	. .	*3.6*	*3.2*
14	Pansy	101.95	102.	102.	. .	102.	. .	102.3	102.5	. .	*104.*	103.1	102.8	. .	. .	*2.0*	*1.7*
17	Clothilda Rosa	103.40	105.5	105.3	. .	104.7	. .	105.2	105.5	. .	105.2	104.5	104.8	106.	*106.3*	*2.9*	*1.4*
18	Colantha Rosa	101.86	102.5	102.4	. .	102 8	. .	103.3	104.	. .	*106.5*	105.	103.3	103.2	103.7	*4.6*	*4.4*
19	Experimentalist	101.40	101.4	101.	. .	101.9	. .	102.4	102.3	. .	105.7	*106.5*	105.2	104.2	104.8	*5.1*	*4.5*
20	Lady Mosscoat	101.95	. .	. .	. .	. .	. .	*104.7*	. .	104.	104.7	. .	. .	. .	. .	*2.8*	*2.6*
21	Melrose	101.75	. .	. .	. .	. .	. .	102.3	. .	*106.5*	105.9	. .	. .	. .	. .	*4.7*	*4.6*
22	Pet	102.12	. .	. .	. .	. .	. .	100.8	. .	102.1	102.	. .	. .	. .	. .	0.0	—0.4
23	Galatea	102.75	101.3	102.5	. .	103.2	. .	103.4	. .	*105.4*	104.7	105.4	. .	. .	. .	*2.6*	*2.6*
24	Melnotta	102.80	103.2	104.4	. .	105.3	. .	105.9	. .	*106.6*	106.	105.8	. .	. .	. .	*3.8*	*3.8*
25	Rosette	102.35	102.8	103.6	. .	104.4	. .	104.7	. .	*105.5*	104.4	105.2	. .	. .	. .	*3.1*	*3.1*
26	Nugget	102.85	102.5	103.5	. .	104.5	. .	*106.5*	. .	106.4	106.3	106.5	. .	. .	. .	*3.8*	*3.8*
27	Blossom	102.85	. .	. .	. .	. .	. .	105.8	. .	106.2	*106.8*	. .	105.8	. .	. .	*4.4*	*3.9*
28	Augustus	102.32	. .	. .	. .	. .	. .	103.7	. .	103.9	*104.8*	. .	103.1	. .	. .	*2.5*	*2.3*
29	Chloe	102.45	102.8	102.8	. .	102.9	. .	104.7	. .	*105.6*	105.5	104.6	. .	. .	. .	*3.1*	*2.9*
30	Josephine	102.35	. .	. .	. .	. .	. .	101.8	. .	102.1	102.3	. .	. .	. .	. .	0.0	—0.1

Italic face type indicates maximum temperature reached in diseased animals.

The foregoing summary includes the entire number of animals of the herd, all of which were inoculated with either the imported or bureau tuberculin at one date or another.

Tables 2 A and 2 B give the temperature records of those animals that received a second injection of the tuberculin. In this series of inoculations the brand of tuberculin used was in all cases different from that employed in the first series, *i. e.*, those animals inoculated with domestic tuberculin in the first instance received the imported product the second time, and *vice versa*. In order to do this it was necessary to allow a certain lapse of time to intervene before the second injection could be made, and as the animals were housed in the same quarters that they had been, there was of course the possibility that some of them might have contracted the disease in this lapse of time and would then react upon second inoculation.

In referring to the two tables giving the temperature results, it will be seen that such an instance did occur in the case of two animals, Rue and Bunn, both of which responded to the test upon the second injection after having been declared healthy by the first. The lapse of time between the introduction of the tuberculin the first and second time was about seven weeks. The animals were killed a few days after the second injection and were both found to be tuberculous.

TABLE 2 A.—Temperature Records of Herd Preliminary to Second Inoculation.

No.	Name.	4 P. M.	6 A. M.	12 M.	3 P. M.	Average normal temperature.	Date of inoculation.	Amount and kind used.	Weight of animal.
1	Polly	102.3	102.3	100.6	101.8	101.70	4 P. M., March 20	2.75 cc., K.	779
4	Gay	101.2	101.6	99.7	101.4	101.00	" "	2.75 " "	855
9	Daisy	101 1	102.2	99.9	101.7	101.22	" "	3. " "	766
2	Bessein	101.1	101.8	101.8	101.1	101.45	4 P. M., May 3	2. " "	814
3	Doubtful	101.7	101.4	102.	101 5	101.65	" "	2. " "	853
5	Aaggie	101.4	101.6	102.7	100.1	101.45	" "	2.1 " "	916
6	Galena	101.2	101.8	101.8	99.7	101.38	" "	2.1 " "	911
15	Melvina	101.1	101.1	101.1	101.2	101.12	" "	2 5 " "	1240
16	Miss Cowslip 6th	102.	101 9	103.2	101 4	102.12	" "	2.5 " "	1236
7	Rue	100.5	101.5	101.4	100.3	100.92	" "	2. cc., B.	880
8	Neth. Nugget	101.3	101.8	101.8	101.8	101.68	" "	2.5 " "	958
10	Bunn	101.3	101 3	101.3	101.3	101.30	" "	2. " "	1151
11	Beauty	101.6	101.5	101.8	101.5	101.60	" "	2.1 " "	982
13	Palmyra	101.6	101.1	101.7	101.5	101.48	" "	2.1 " "	821
14	Pansy	101.7	101.4	102.	100.9	101.50	" "	2.0 " "	795
12	Bessie 2d	101.3	99.6	100.3	100.	100.30	" "	2. " "	694
18	Colantha Rosa	101.9	101.4	101.9	101.2	101.60	" "	1.75 " "	955
19	Experimentalist	102.	102.1	102.	102.	101.80	" "	3. " "	1261

TABLE 2 B.—Temperature after Inoculation.

No.	Name.	Average normal.	5 hours.	8 hours.	10 hours.	13 hours.	16 hours.	18 hours.	20 hours.	24 hours.	Reaction above average normal.	Reaction above highest normal.
1	Polly	101.70	103.7	104.5	104.9	*105.1*	103.4	102.7	101.6	. . .	*3.4*	*2.8*
4	Gay	101.00	101.3	101.2	101.1	101.5	101.7	101.5	101.1	. . .	0.7	0.1
9	Daisy	101.22	101.9	101.2	101.7	101.7	101.8	102.	102.3	99.7	1.1	0.1
2	Bessein	101.45	101.5	101.5	101.2	101.4	102.	102.9	101.5	. . .	1.4	1.1
3	Doubtful	101.65	101.4	101.2	101.8	102.5	102.2	102.1	102.	. . .	0.8	0.5
5	Aaggie	101.45	102.2	102.	101.8	102.	102.2	102.4	102.9	102.7	1.5	0.2
6	Galena	101.38	101.7	101.7	101.6	101.7	102.2	101.8	101.6	. . .	0.8	0.0
15	Melvina	101.12	102.3	101.8	101.9	102.4	101.9	102.2	*103.1*	103.	*2.0*	*1.9*
16	Miss Cowslip 6th	102.12	102.5	101.8	102.4	102.1	103.5	103.4	103.4	. . .	1.4	0.2
7	Rue	100.98	101.	101.	101.4	103.1	104.	104.5	104.4	. . .	*3.5*	*3.0*
8	Neth. Nugget	101.68	101.5	101.8	102.2	103.3	*105.2*	104.9	104.7	. . .	*3.5*	*3.4*
10	Bunn	101.30	100.9	101.3	101.5	*103.4*	103.3	102.6	102.4	. . .	*2.1*	*2.1*
11	Beauty	101.60	101.6	101.4	101.8	102.6	102.9	102.7	102.5	. . .	1.3	1.1
13	Palmyra	101.48	101.3	101.5	101.9	104.6	105.4	*105.5*	105.1	. . .	*4.0*	*3.8*
14	Pansy	101.50	102.	103.	103.9	*105.*	104.9	104.6	104.2	. . .	*3.4*	*3.0*
12	Bessie 2d	100.30	*104.1*	103.6	103.	102.6	102.	101.9	101.9	. . .	*3.8*	*2.8*
18	Colantha Rosa	101.60	101.8	102.1	101.8	102.6	103.	102.7	102.1	. . .	1.4	1.1
19	Experimentalist	101.80	102.4	105.	*105.7*	103.6	103.9	104.9	105.4	103.8	*3.9*	*3.7*

It will be noted in several instances that animals failed to react when inoculated the second time with the imported lymph that had reacted upon first injection with the bureau tuberculin. This evident discrepancy between the efficiency of the two brands in picking out the diseased animals, can undoubtedly be explained. The failure to produce a reacting temperature in those animals that had previously been diagnosed as tuberculosis with the bureau tuberculin is due to the minimum doses used. The bureau fluid as injected is more

concentrated than the imported product as used in the diluted condition by us, so that the amount of actual tuberculin introduced at the second injection was less than what was used at the first. While an introduction of this same quantity sufficed to produce a reacting temperature in the first inoculation of an animal, yet this same amount introduced into an animal that had been previously inoculated with a stronger dose sometimes failed to produce the usual febrile symptoms.

As evidence that this explanation is possible note the tabular résumé of animals inoculated as seen in Table 3. Out of a possible twenty-eight cases of which we can determine with certainty whether the diagnoses were correct or not as *post mortems* were held, the imported lymph diagnosed correctly in twenty-one out of twenty-eight cases. If, however, we exclude those animals that received the imported lymph after having first been injected with the stronger Bureau lymph (nine animals were thus injected, but as two were not killed seven may be deducted), then the number of cases correctly diagnosed is eighteen out of a possible twenty-one.

Two out of the three exceptions (Bunn and Rue) may possibly have contracted the disease after they were inoculated with the imported tuberculin as they were not killed until seven weeks later.

The results obtained with the Bureau tuberculin are as follows:

Eighteen animals were inoculated with this brand, and of this number thirteen showed reaction fevers, indicating a diseased condition. With these thirteen that were diagnosed as diseased, characteristic tubercular lesions were noted upon each autopsy. Three of the five non-reacting animals were also killed. Of these two cases (Doubtful and Beauty) had not reacted upon first and second injections, the third one, Colantha Rosa reacted the first time with imported tuberculin, but in the second injection with the Bureau fluid, an accident occurred in which a considerable part of the dose was lost, consequently the animal is excluded. When these three animals were killed Colantha Rosa and Beauty were found diseased but Doubtful was entirely free from it. Omitting Colantha Rosa on account of the above accident the record would indicate that the Bureau tuberculin returned correct diagnoses in fourteen out of a possible fifteen cases, or ninety-three per cent.

The single instance in which the Bureau tuberculin failed to diagnose correctly was in the same animal (Beauty) that did not respond to the imported product. In this instance the test failed to indicate that the animal was diseased, but the autopsy showed a well pronounced diseased condition of the lymphatic glands of the pharynx. The results of both tests show the efficiency of tuberculin as a diagnostic agent, as follows:

Thirty animals were inoculated in all; of these twenty-five reacted and the remainder were declared healthy. The autopsy record shows that in every one of the twenty-five reacting animals evident lesions of the disease were discovered.

Of the five animals that failed to react three were slaughtered and one of these was found to be somewhat diseased so that in the twenty-eight cases where *post-mortems* were made, the test failed only once.

COMPARISON OF TUBERCULIN TESTS WITH PHYSICAL EXAMINATION.

In order to compare the tuberculin test in efficiency with the physical method of examination, a number of the adult animals were selected and subjected to a careful physical inspection. The details of the examination are recorded with the autopsy notes on page 536–41. In only two cases (Daisy and Clothilda Rosa) were marked symptoms found that were diagnosed as undoubtedly tuberculosis. Two other animals were also diagnosed as diseased although the symptoms were less marked, and four animals were noted as suspicious.

Reference to Table 3 will show the instances in which the physical diagnoses were confirmed by the autopsy. Of the two animals that were regarded as unquestionably diseased one showed a generalized tubercular condition strongly manifested in the udder. The other animal (Daisy) was slightly tuberculous (one lymph gland), but an old pleurisy had misled the veterinarian in his physical examination. In all, six out of a possible sixteen were correctly diagnosed by the physical examination. The remainder of the herd that was later subjected to the tuberculin test was not closely examined by the veterinarian, but all of the animals were in apparent good health as far as could be noted upon a cursory examination.

TABLE 3.—Résumé comparing Physical Examination and Tuberculin Test with Post-mortem Results.

No.	Name.	Physical diagnosis.	Reaction in Degrees Fahrenheit. With bureau tuberculin.	Reaction in Degrees Fahrenheit. With imported tuberculin.	Autopsy record.	Diagnosed Correctly by: Physical examination.	Diagnosed Correctly by: Tuberculin test. Bureau.	Diagnosed Correctly by: Tuberculin test. Imported.
1	Polly	Sound	*4.8*	*a2.9* (2)	Tuberculous		1	1
2	Bessein	"	1.6	1.4 (2)	Not killed			
3	Doubtful	"	1.7	0.8 (2)	Healthy	1	1	1
4	Gay	Suspicious	*3.4*	0.6 (2)	Tuberculous	1	1	
5	Aaggie, Neth. Beauty	"	*4.3*	1.5 (2)	"	1	1	
6	Galena	Sound	*3.7*	0.8 (2)	"		1	
7	Rue	Tuberculous	*3.5* (2)	1.6	"	1	1	
8	Neth. Nugget	Suspicious	*3.5* (2)	*2.8*	"	1	1	1
9	Daisy	Tuberculous	*3.0*	1.1 (2)	"		1	
10	Bunn	Sound	*2.1* (2)	0.6 (2)	"		1	
11	Beauty	Tuberculous	1.3 (2)	1.6	"			
12	Bessie 2d	Suspicious	*3.8* (2)	*3.1*	"		1	1
13	Palmyra	Sound	*4.0* (2)	*3.6*	"		1	1
14	Pansy	"	*3.4* (2)	*2.0*	"		1	1
15	Melvina	"	*4.4* (2)	*2.0* (2)	"		1	1
16	Miss Cowslip 6th	"	1.2	1.4 (2)	Not killed			
17	Clothilde Rosa	Tuberculous	*b*	*2.9*	Tuberculous	1		1
18	Colantha Rosa	Sound	*c*1.4 (2)	*4.6*	"			1
19	Experimentalist	No examination	*3.9* (2)	*5.1*	"		1	1
20	Lady Mosscoat	" "		*2.8*	"			1
21	Melrose	" "		*4.7*	"			1
22	Pet	" "		0.0	Healthy			1
23	Calves.—Galatea	" "		*2.6*	Tuberculous			1
24	Melnotta	" "		*3.8*	"			1
25	Rosette	" "		*3.1*	"			1
26	Nugget	" "		*3.8*	"			1
27	Blossom	" "		*4.4*	"			1
28	Augustus	" "		*2.5*	"			1
29	Chloe	" "		*3.1*	"			1
30	Josephine	" "		0.0	Healthy			1
					Ratio of cases diagnosed correctly	6 : 16	14 : 15	21 : 28

a. Figure two enclosed in parenthesis as such (2) indicates the second inoculation.—*b*. Animal died before second inoculation.
c. Through an accident a part of dose was lost, hence no reaction fever indicating disease.

DETAILS OF PHYSICAL EXAMINATION AND AUTOPSY RECORDS.

Details from the autopsy notes are here given in order that the actual condition of each animal may be compared with the preliminary diagnoses and thus show more fully the reasons for the conclusions that will be drawn later. In working over the diseased tissues the doubtful ones have been submitted to a careful microscopical examination, which has been made by one of our advanced students, Mr. E. P. Carlton.

POLLY.—Grade Jersey, eighteen months old.

History.—No trace of disease apparent, condition excellent, fat. Weight, February 20, 1894, 776 pounds.

Physical diagnosis.—Healthy.

Tuberculin test.—Marked reaction with both injections; February 20, Bureau tuberculin; March 22, imported brand.

Autopsy.—March 22, weight, 808 pounds. Left lung studded with small hard caseous tubercles, some of which were broken down into purulent matter. Submaxillary glands affected. Peritoneum over small intestine dotted with pearly protuberances, cheesy or calcareous.

Tubercles in lung seem to have developed with relation to circulatory system and not the bronchi. Bronchial glands healthy. Microscopical examination showed the infection to have been transmitted to the lymphatic circulation through the large follicles of mucous membrane of intestine.

DOUBTFUL.—Grade Jersey, five years old.

History.—Good.

Physical diagnosis.—Sound.

Tuberculin test.—Inoculated February 24 and May 2, 1894. No reaction in either case.

Autopsy.—May 9. No signs of tubercle on post-mortem.

GAY.—Registered Jersey, estimated six years old.

History.—Apparently healthy. Weight February 20, 871 pounds.

Physical diagnosis.—Suspicious, slight thickening of submaxillary lymphatics. Crepitation over portion of left lung. Increased respiratory murmur at lower end of trachea.

Tuberculin test.—February 20, reaction with domestic tuberculin. March 20, no reaction with imported tuberculin (only 28 days between injections).

Autopsy.—May 16, weight, 855 pounds. Single large abscess in intestinal wall (ileum). Several small pearly nodules on ileum and colon. Incipient tubercular spots in pharyngeal glands. Large, well-developed tubercle in right lung. Udder enlarged but flaccid, upon section tissue appears filled with small nodular masses, whitish in color. Few bacilli found in scrapings from inside of milk sinus.

AAGGIE NETHERLAND BEAUTY.—Registered Holstein, five years old.

History.—Animal always thin. Absolutely impossible to fatten when in lactation. Weight, February 22, 1017 pounds.

Physical diagnosis.—Enlarged submaxillary lymphatics. Dullness on percussion over upper posterior part of right lung and slight crepitation. Suspicious.

Tuberculin test.—Inoculated with Bureau tuberculin February 23. Strong reaction. Inoculated May 3 with imported tuberculin. Reaction 1.5° F.

Autopsy.—May 12, weight 916 pounds. Pharyngeal glands filled with small tubercles, pin head in size. Mediastinal glands contain numerous small tubercles. Lesions apparently point to a recent infection.

GALENA.—Grade Jersey, estimated five years old.

Physical diagnosis.—Sound.

Tuberculin test.—Bureau tuberculin, February 23. Reaction. Imported tuberculin May 2. No reaction.

Autopsy.—May 12, weight 911 pounds. Pharyngeal glands affected. Small tubercles found in mediastinal glands, several pearly tubercles in ileum.

RUE OF SILVER SPRINGS.—Registered Jersey, ten years old.

History.—Good. Weight, March 12, 980 pounds.

Physical diagnosis.—Enlarged submaxillary lymphatics. Dullness on percussion and slight crepitation over upper posterior part of right lung.

Tuberculin test.—Inoculated March 13, with imported tuberculin. Reaction of 1.8° F. Inoculated May 2, with Bureau tuberculin. Marked reaction.

Autopsy.—May 14. Weight 880 pounds. Mediastinal glands cheesy and calcareous. Right and left lung show several small tubercles. Number of pearly nodules in ileum.

NETHERLAND NUGGET.—Registered Holstein, three years old.

History.—Good. Weight, March 12, 1122 pounds.

Physical diagnosis.—Suspicious. Submaxillary glands enlarged. Increased respiratory murmur over portions of each lung.

Tuberculin test.—Inoculated with imported tuberculin March 12. Reaction. With Bureau tuberculin May 2. Reaction.

Autopsy.—May 15, weight 958 pounds. Several pearly nodules in the wall of ileum. In right lung two or three tiny tubercles. In left lung several large pneumonic areas.

DAISY.—Grade Jersey, fourteen years old.

History.—Animal thin and emaciated, but poor condition seems to be a family trait, for two generations on mother's side were always thin; heavy milkers. Weight February 20, 778 pounds.

Physical diagnosis.—Tuberculous. Thickening of submaxillary lymphatics. Dullness on percussion over considerable area of each lung; husky cough; heaving of flank. Increased resonance over portion of left lung. Bronchial breathing over lower anterior portion of left lung. Emaciated. Hide bound.

Tuberculin test.—Inoculated February 20. Gave reaction. Second injection with imported tuberculin March 20. No reaction.

Autopsy.—March 22. Anterior mediastinal gland slightly enlarged; showed a few small tubercles on periphery. Tissue examined microscopically and bacilli demonstrated. Other organs showed no evidence of tuberculosis. Dullness of percussion due to an old pleurisy, therefore the physical diagnosis as tuberculous not warranted by evidence at autopsy.

BUNN.—Grade Holstein, eleven years old.

History.—Good. Weight March 12, 1260 pounds.

Physical diagnosis.—Sound.

Tuberculin test.—Inoculated March 12 with imported tuberculin. No reaction. Bureau tuberculin May 2. Reaction 2.1° F.

Autopsy.—May 15, weight 1150 pounds. One tubercle in posterior lobe of left lung. Numerous pearls in the wall of ileum. Inflamed areas in pharyngeal glands.

BEAUTY.—Native, estimated twelve years old.

History.—Good. Weight March 12, 1120 pounds.

Physical diagnosis.—Dullness on percussion over posterior part of right lung. Bronchial breathing over lower anterior part of right lung. Probably tuberculous.

Tuberculin test.—March 12, imported tuberculin. Reaction 1.7° F. May 2, Bureau tuberculin. Reaction 1.3° F.

Autopsy.—May 17, weight 982 pounds. Shows a healed-over tubercle in left lung; also a single pearly nodule in intestine. Several well marked tubercles in anterior mediastinal glands.

BESSIE 2D.—Grade Jersey, seven years old.

History.—Rather poor in flesh. Weight March 12, 930 pounds. About April 10 animal began to show signs of brain trouble and difficulty in standing or walking, ate but little. Weight April 12, 770 pounds. Milk decreased much in quantity (0.8 pounds per milking).

Physical diagnosis.—Suspicious. February 20, submaxillary gland slightly enlarged; crepitation over part of right lung.

Tuberculin test.—Reacted with imported tuberculin, March 13. Reacted upon second injection with Bureau brand, May 2.

Autopsy.—May 4, weight 694 pounds. Right lung diseased; showed a few large nodules, calcareous. Bronchial glands filled with numerous tubercles.

Marked changes in tissue of cerebellum, although no bacilli could be demonstrated in sections of tissue.

PALMYRA.—Grade Jersey, five years old.

History.—Condition always good. Weight March 12, 906 pounds.

Physical diagnosis.—Given as sound. Slight crepitation over portion of right lung.

Tuberculin test.—Inoculated March 12, with imported tuberculin. Reaction. Second injection, May 2, with domestic tuberculin. Reaction.

Autopsy.—May 15, 821 pounds. All of mediastinal glands badly affected, cheesy and calcareous. One tubercle in posterior lobe left lung. Numerous pearly protuberances from wall of ileum.

PANSY.—Grade Jersey, two years old.

History.—Animal fat and in excellent condition. Weight 816 pounds, March 12.

Physical diagnosis.—sound.

Tuberculin test.—Injected March 13. Reaction fever of two degrees above normal with imported tuberculin; although only 1.7 degrees above highest normal. Second injection with Bureau tuberculin, May 2, gave a strong reaction.

Autopsy.—May 4, weight 795 pounds. Bronchial glands filled with tubercules. A few well marked nodules in each lung. A well defined but not a bad case. Lesions apparently recent.

MELVINA.—Registered Short Horn, five years old.

History.—Condition always good except nasal catarrh which has been more or less severe for past three years. Weight 1280 pounds February 22.

Physical diagnosis.—Sound with the exception of above symptom.

Tuberculin test.—Bureau tuberculin, February 23. Marked reaction. Imported tuberculin May 2. Reaction.

Autopsy.—May 11, weight 1240 pounds. Pharyngeal glands enlarged and calcareous. Mediastinal also contain numerous tubercles, many of which are broken down into abscesses. Numerous large abscesses and infiltrated areas in both right and left lung. Lesions point to an old chronic infection.

CLOTHILDE ROSA.—Registered Holstein. Five years old.

History.—Animal in good health until December, 1893. Calf dropped December 24. Weight at this time 1150 pounds. Began to lose in flesh from this date. Swelling on udder noticed about January 20. Became emaciated very rapidly. Weight March 13, 1077 pounds. Inoculated at this date with tuberculin. Died April 3.

Physical diagnosis.—Tuberculous. Enlarged maxillary glands; dullness and crepitation over upper part of left lung. Increased respiratory murmur at foot of trachea. Right hind quarter of udder much enlarged and hard; mucous membrane pale; coat rough.

Tuberculin test.—Reaction fever present, although there was an abnormally high temperature before inoculation.

Autopsy.—April 3 weight 855 pounds. Abdominal peritoneal surface covered with network of fine tubercles following blood vessels. Peritoneum of wall covered with nodules. Bronchial glands much enlarged and filled with tubercles. Large clusters of nodules adherent to lungs and costal pleura (grapes) and also imbedded in tissue of lungs. Affected quarter of udder weighed twenty-three pounds; a solid yellowish mass, calcareous, in few places. Microscopical examination showed a very acute generalized stage of the disease; bacilli present in milk in very large numbers. This instance shows the effect of calving on animals already affected with tuberculosis.

COLANTHA ROSA.—Registered Holstein. Eighteen months old.

History.—Good. Weight 933 pounds, March 12.

Physical diagnosis.—Sound.

Tuberculin test.—Injected with imported tuberculin March 12. Strong reaction. Second injection, May 2, with domestic tuberculin (only 1.75 cc. injected, a part of dose accidentally lost). Rise in temperature of 1.4° F.

Autopsy.—May 10 weight 955 pounds. Only tuberculous tissue found in animal was in left posterior mediastinal gland, which had a few discrete tubercles.

EXPERIMENTALIST.—Registered Jersey Bull. Three years old.

History.—Presented when a young calf to the station by N. Y. Agricultural Experiment station. Weight 1336 pounds, March 12.

Physical diagnosis.—Apparently sound, although detailed examination not made.

Tuberculin test.—Inoculated March 13, with imported tuberculin. Strong reaction. Second injection with domestic tuberculin May 2. Reaction.

Autopsy.—Showed a badly affected chronic case. Pharyngeal and mediastinal glands well filled with calcareous tubercles. Both lungs showed numerous tubercles, hickory nut in size, imbedded in tissue; also several protruding from costal surface (grapes). Testis slightly affected.

LADY MOSSCOAT.—Short Horn. Two years old.

History.—Daughter of Miss Cowslip 6th.

Tuberculin test.—Showed reaction of 2.7° F.

Autopsy.—May 12. Mediastinal glands show a few small tubercles (pin-head in size). Acute inflamed areas in different lobes of both lungs. One or two small tubercles on ileum. Animal apparently infected recently by the way of the air passages.

MELROSE.—Short Horn. Eighteen months old.

Tuberculin test showed tuberculous condition of animal.

Autopsy.—May 11. Mediastinal glands were completely infiltrated, calcareous, cheesy, and in some cases purulent. One tubercular abscess, size of walnut, in right lung; also several smaller tubercles with acutely inflamed tissue surrounding them. Left lung slightly affected; one pearly nodule on ileum.

PET.—Ayrshire, sixteen months old.

History.—Perfectly healthy.

Tuberculin test. May 10, injected with imported tuberculin; no reaction.

Autopsy.—In right lung was found one small healed tubercle completely encysted in a fibrous capsule.

GALATEA.—Grade Jersey, five months old.

History.—Daughter of Galena and Experimentalist. Kept housed in same barn with other stock since birth. Apparently in good health.

Tuberculin test.—Inoculated May 2 with imported tuberculin; reaction.

Autopsy.—One small tubercle in left lung. Left mediastinal gland (posterior) showed a few discrete tubercles; bronchial glands possessed inflamed areas. Abdominal viscera healthy.

MELNOTTA.—Short Horn, four months old.

History.—Apparently in good condition, with the exception of a thickening between bones of lower jaw. Kept in stable with remainder of herd since birth.

Tuberculin test.—Injected with imported tuberculin, May 2; reaction.

Autopsy.—A large abscess enclosed in a fibrous capsule occupying space of pharyngeal gland. Mediastinal glands showed numerous tubercules some of which were calcareous and cheesy. Few small nodules in left lung. Intestines normal but mesenteric glands show numerous young tubercles.

ROSETTE.—Grade Jersey, five months old.

History.—Housed with herd since birth.

Tuberculin test.—Made with imported tuberculin, May 2; reaction.

Autopsy.—Incipient tubercles in right mediastinal gland; well developed masses in left mediastinal lymphatic glands. Slight nodular growths in a few of mesenteric glands; also numerous tiny tubercles in liver.

Post-mortem appearances would indicate a mixed source of infection.

NUGGET.—Registered Holstein, six months old.

History.—Housed in same barn with herd since birth.

Reaction with imported tuberculin, May 2.

Autopsy.—May 8. Superpharyngeal glands infiltrated and cheesy. Left anterior mediastinal studded with small hard tubercles. Several small tubercles in mesenteric glands.

BLOSSOM.—Grade Jersey, five months old.

History.—Housed with other animals.

Tuberculin test showed, May 2, a strong reaction.

Autopsy.—May 12. Large abscess in pharyngeal gland. Mesenteric glands largely infiltrated with small size tubercles. Lungs healthy.

AUGUSTUS.—Holstein Bull, six months old.

Tuberculin test.—May 2, indicated tuberculosis.

Autopsy. May 12. Right posterior mediastinal lymphatic full of small tubercles. Several pearly nodules on wall of ileum; also numerous young tubercles in mesenteric glands.

CHLOE.—Holstein, four months old.

History —Daughter of Clothilde. Mother was tuberculous when with calf and rapidly wasted away with acute generalized stage of the disease. Udder markedly affected since calving.

Tuberculin test.—May 2, with imported tuberculin; reaction.

Autopsy.—May 12. Mesenteric glands filled with numerous nodules pin-head in size. Intestinal glands covered here and there with soft, young tubercles. Liver with several tuberculous areas scattered through tissue.

Unquestionably the calf must have been suckled on tuberculous milk from the very beginning.

JOSEPHINE.—Grade Jersey, seven weeks old.

Tuberculin test indicated no disease.

Autopsy.—May 12, showed no evidence of tubercular lesions.

In order that a more comprehensive idea may be obtained of the different organs affected, their relative frequency, and also to bring out more clearly the probable source of infection, the autopsy records of tuberculous animals are arranged in the following tabular form :

TABLE 4.—Showing Distribution of Disease in Animals with Probable Source of Infection.

No.	Name.	Age.	Breed.	Pharyngeal and submaxillary lymph glands.	Bronchial and mediastinal lymph glands.	Lungs. Right.	Lungs. Left.	Intestines.	Mesenteric glands.	Other organs.	Probable source of infection.	General remarks.
1	Polly	18 mos.	Grade Jersey	T	T	. .	T	T	. .	. . .	. . . . .	Disease generalized, well developed.
4	Gay	6 yrs.	Jersey	T	. .	T(1)	. .	T	. .	Ud'r T.	Pulmonary	Widely distributed.
5	Aaggie	5 "	Holstein	T	T	. .	. .	. .	. .	. . .	"	Incipient stage.
6	Galena	5 "	Grade Jersey	T	T	. .	. .	T	. .	. . .	"	Incipient stage.
7	Rue	10 "	Jersey	. .	T	T	T	T	. .	. . .	. . . . .	Well developed case.
8	Neth. Nugget	3 "	Holstein	. .	. .	T	. .	T	. .	. . .	Enteric . .	Tubercles in lungs partially encysted.
9	Daisy	14 "	Grade Jersey	. .	T(1)	. .	. .	. .	. .	. . .	Pulmonary	Chronic case, localized.
10	Bunn	11 "	"	. .	. .	. .	T(1)	T	. .	. . .	Enteric . .	Udder glands greatly enlarged.
11	Beauty	12 "	Native	. .	T	. .	T(1)	. .	. .	. . .	Pulmonary	Tubercles in lung encysted.
12	Bessie 2d	7 "	Grade Jersey	. .	T	T	. .	. .	. .	Liv. T.	"	Acute in lungs; serious brain lesions.
13	Palmyra	5 "	"	. .	T	. .	T(1)	T	. .	. . .	"	Chronic.
14	Pansy	2 "	"	. .	T	T	T	. .	. .	. . .	"	Well defined but recent case.
15	Melvina	5 "	Short Horn	T	T	T	T	. .	. .	. . .	"	Num'r's abscesses in lung; old case; bad.
17	Clothilde Rosa	5 "	Holstein	. .	T	T	T	T	T	Ud'r T.	. . . . .	Acute gen'lz'd case; tuberculous th gh't.
18	Colantha Rosa	19 mos.	"	. .	T	. .	. .	. .	. .	. . .	Pulmonary	Recent infection.
19	Experimentalist	3 yrs.	Jersey Bull	T	T	T	T	. .	. .	Testis T.	"	Bad case; chronic.
20	Lady Mosscoat	2 "	Short Horn	. .	T	T(1)	T	T	. .	. . .	"	Acute type; recent.
21	Melrose	18 mos.	"	. .	T	T	T	T(1)	. .	. . .	"	Well developed case.
23	Galatea	6 "	Grade Jersey	. .	T	. .	T(1)	. .	. .	. . .	"	Recent infection.
24	Melnotta	4 "	Short Horn	T	T	. .	T	. .	T	. . .	"	Large absc's in ph'ryng'l lymph gland.
25	Rosette	5 "	Grade Jersey	. .	T	T	. .	. .	T(1)	Liv. T.	Mixed . .	Thoracic cavity badly affected.
26	Nugget	5 "	Holstein	T	T	. .	. .	. .	T	. . .	" . .	Strongly developed in thorax.
27	Blossom	6 "	Grade Jersey	T	. .	. .	. .	. .	T	. . .	" . .	Abscesses in pharyngeal lymphatics.
28	Augustus	6 "	Holstein	. .	T	. .	. .	T	T	. . .	" . .	Incipient case.
29	Chloe	4 "	"	. .	T	. .	. .	T	T	Liv. T.	Enteric . .	Derived from suckling diseased mother.
Per cent of cases in which various organs were diseased				36 %	81 %	44 %	52 %	48 %	28 %			
Per cent where lungs were affected				. .	. .	68 %						
Per cent showing infection by air passages and intestinal canal				100 %				64 %				

(1) A single tubercle found in affected organ.

An examination of the above table shows one or two points that are to be especially emphasized. Ordinarily, calves are not badly affected with the disease, but when the conditions in our herd are taken into consideration, the history of the calves has a special interest. The eight calves were confined in the same barn as the remainder of the herd and consequently were subjected to the influence of tubercular virus, if present in the air. The fact that every calf under six months with a single exception contracted the disease speaks strongly for the danger that animals undergo when exposed to the disease. In several instances, also, there is good evidence that the infective material was introduced into the body by the way of the intestinal tract. Such was undoubtedly the case in calf named Chloe.

Her mother, Clothilde, was in apparent good health until the calf was dropped, when she began immediately to "run down," wasting rapidly away, and soon developed a marked case of tuberculosis of the udder. A microscopic examination of the milk revealed the presence of the tubercle bacilli and a rabbit inoculated with a small quantity of the milk died in the course of seven weeks. The subsequent development of the disease in the intestines of her calf strongly indicates a direct transmission of the disease from mother to offspring by means of the milk.

In several other cases, the development of the disease either in the intestines or in the mesenteric glands shows that the calves had contracted the disease by their food or drink. Five of them were thus more or less diseased in the abdominal organs, indicating a probable contamination from infected food or drink. As the milk with which they were fed is now known to have contained germs of this disease there is hardly any question but that the intestinal infection was due to the milk fed them during this short period.

The condition in our herd showed a violent epidemic of the disease to be present, and so rapidly was the infective material being distributed that even young calves were in almost all cases stricken with the disease in a few months. In the majority of cases the disease was in an early stage. but in several instances the lesions were so generalized and of such a character as to lead us to infer that the animal had been afflicted for some time; yet the physical appearance of the herd was

apparently good, and had it not been for the tuberculin test the presence of the disease would not have been detected for some time except in a single instance.

Wisconsin Experiment Station.

THE USE OF MALLEIN.

By Dr. S. J. J. Harger,
Professor of Anatomy and Zoötechnics, Veterinary Department, University of Pennsylvania.

[Read at Semi-annual meeting of Pennsylvania State Veterinary Society, Harrisburg, September 4, 1894.]

I take great pleasure in accepting the kind invitation of our president to call your attention to-day to a subject in which I have been interested and whose results have been a matter of more or less close observation with me, "The Use of Mallein," in the domain of the veterinarian. Although known only for a few years, the value of this agent in the diagnosis of glanders and in preventing its spread from animal to animal and from animal to man is attracting almost universal attention and exciting warm discussions, especially so in European veterinary societies and veterinary periodicals. Every one of us has been requested to examine horses which, after the most careful examination and deliberation, we pronounced "suspicious;" we starved and purged him without gaining any satisfactory information. Again, in those latent cases which have partially recovered or perhaps never have shown any sufficient external signs of the disease to attract attention, we have the most fertile source of contamination for the propagation of glanders. Thanks to "mallein" that we can seek some refuge in our dilemma.

In a clinical lecture[1] published in the December number of the *Journal of Comparative Medicine and Veterinary Archives*, I stated that mallein was discovered by Kalning of the Veterinary School at Dorpat. According to more recent publications,[2] this lymph was discovered in 1888 by Helman, a Russian veterinarian, who made his first experiments in 1889. On April 27, 1890, he read a communication before the veterinary Society of Petersburg that he had endeavored to produce

[1] Delivered at the Veterinary Department, University of Pennsylvania.
[2] Kostoff. Sulla diagnosi della morva equina. Giorn. di Veter. Militaire, 1893, p. 521.

immunity from glanders in animals with "extracts from the cultures of glanders," but that it was almost prohibited in glanderous subjects, because of the excessive elevation in the bodily temperature and the intense local inflammation. He inoculated fifteen glandered horses with 1 c.c. each of his mallein and found a rise of 2° to 3° C. in the temperature and a characteristic tumor at the point of injection.

Helman's lymph, as mallein may be called, belongs to the same category as Koch's lymph. The technique of its preparation may vary slightly and is described in the above named article; but the principles are identical. It is a watery extract of the bacilli cultures, so diluted that 1 c.c. is an ordinary dose. It can be precipitated with alcohol as a white crystalline alkaloid, the dose of which is .1 to .05 gram, and can be preserved in a closely corked vial to be used as required; this preparation is more easily preserved and more effective than the liquid mallein. Both are diluted with a suitable quantity, about two drams, of a two per cent carbolic acid solution before making the injection.

Injection.—The temperature, pulse and respirations are taken under uniform conditions every three hours during the preceding twenty-four hours in order to ascertain any undue fluctuations. If the temperature is regular, that at the time of the injection is taken as the basis. Strict antisepsis should be observed; the skin should be shaved and washed with antiseptic lotions at the seat of operation and a needle held over a spirit flame before each injection, in order to avoid septic contamination. The shoulder or the side of the neck is selected. Midnight or early in the morning is the best time for making the injection; the former is preferable. Succeeding the injection, the temperature, pulse and respiration should be taken every two hours during the next twenty-four.

Symptoms. Healthy horse:—No marked symptoms as a rule. There are no constitutional disturbances; generally no local swelling; if so it may be one-half inch in thickness and two or three inches in diameter. The temperature in my experience (Bureau of Animal Industry Mallein) has not risen above 3° C. It may reach 1.9° C. even in the healthy animal, and in very exceptional cases 3° C.; but in these extremes the temperature is *atypical* (see Table 1, Nos. 24 and 25, 13 and 14) and is not indicative of a specific disease process.

Glandered horse:—The general symptoms, sometimes very marked, are weakness, drowsiness, loss of appetite, staring coat, increased and full pulse, hurried respiration and muscular trembling; sometimes colicky pains, polyuria, and even stranguary are seen.

At the seat of injection, there is nearly always an inflammatory swelling which in my opinion, asepsis having been observed, is of much diagnostic value. I have never observed its absence although according to good authorities local inflammation does not invariably follow. It may vary in size from that of a hand to that of a child's head. It is circumscribed, hot, painful to pressure and œdematous; it sometimes suppurates and forms a small abscess. It disappears in from three to six days.

The temperature, of course, is the most looked-for sign, and is sometimes difficult of interpretation. It may vary slightly with the dose, the idiosyncrasy and the condition of the animal and his surroundings. The rise in the temperature may be typical or atypical. It is of great importance to discriminate between these two. In the *typical* reaction, the temperature curve gradually rises, remains stationary for a variable time and then slowly descends to the normal; sometimes there is a slight secondary rise making the temperature curve dicrotic, also seen sometimes in healthy horses (see Case I); sometimes there is a momentary descent, lasting for two or three hours, before the ascent (see Case III); at times, at the termination, the temperature drops below the normal. In the *atypical* reaction, the temperature rises very suddenly and usually in the course of a few hours, sometimes later; the fall is slower. Sometimes the descent is very sudden. The atypical reaction, according to M. Leclainche, is sometimes observed in healthy horses. The temperature is of absolute diagnostic value only when it has the typical character. According to Schindelka, horses with the atypical reaction have never been found glandered. (See[1] Table I, 13, 14, 15, 24 and 25.) However, Case No. 4 (of my own) would indicate that a second injection is necessary to remove all doubt. Here possibly is a source of error for which mallein has often been blamed.

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1. *Deutsch. Zeit. f. Thier. u. Vergleich. Path.*

TABLE I.

Elevation of Temperature.	No. of Animals.	No. destroyed.	Post-mortem. Glanders.	Post-mortem. No glanders.	No. of stall.	
3.6° C.	1	1	1	—	1	typical reaction.
3.1	2	2	1	1	2	typical, glanders.
					3	atypical.
3.0	1	1	1	—	4	typical reaction.
2.9	1	1	1	—	5	" "
2.7	2	2	2	—	6	" "
					7	
2.6	2	2	*2	—	8	" "
					9	
2.5	1	1	1	—	10	" "
2.4	3	3	2	—	11, 12	" "
					13	atypical.
2.2	4	4	2	2	14, 15	atypical, no glanders.
					16, 17	typical, glanders.
2.1	4	4	4	—	18, 19, 20, 21	typical.
2.	2	2	2	—	22	"
					23	
1.9	2	2	—	2	24	atypical.
					25	
1.7	2	2	1	1	26	after third injection 2° glanders.
					27	after second inject. 5° negative.
1 5	1	—	—	—	28	not destroyed.
1.4	1	1	—	—	29	
1.3	2	1	—	1	30	destroyed, negative.
					31	not destroyed.
1.2	6	3	--	3	32, 33, 34	negative.
					35, 36, 37	not destroyed.
1.1	1	1	—	1	38	negative.
1.0	3	1	—	1	39, 40, 41	"
.9	1	1	—	1	42	"
.6	1	—	—	—	43	not destroyed.
	43	35	20	15	—	

The reaction commences in from one to sixteen hours; generally from two to four hours after the injection. It reaches its maximum in from ten to fourteen hours and becomes normal in from eight to eighty-four hours.

TABLE II.[1]

Hours afterward.	Beginning of reaction.			Highest temperature.			Temperature as before the injection.			Duration of the reaction.		
	Horse.	Geld.	Mare.	Horse.	Geld.	Mare.	Horse.	Geld.	Mare.	Horse.	Geld.	Mare.
1	2	1	1	—	—	—	—	—	—	—	—	—
2	11	6	5	3	3	—	—	—	—	—	—	—
3	4	1	3	—	—	—	—	—	—	1	—	1
4	7	4	3	9	5	4	—	—	—	—	—	—
5	2	1	1	1	1	—	—	—	—	1	1	—
6	7	6	1	2	—	2	—	—	—	—	—	—
7	—	—	—	2	—	2	—	—	—	—	—	—
8	5	2	3	2	1	1	1	1	—	1	1	—
9	2	2	—	—	—	—	2	2	—	—	—	—
10	—	—	—	5	2	3	—	—	—	1	1	—
11	—	—	—	—	—	—	—	—	—	—	—	—
12	1	1	—	8	5	3	1	—	1	1	1	—
13	—	—	—	2	2	—	—	—	—	1	—	1
14	—	—	—	2	1	1	—	—	—	2	1	1
15	—	—	—	1	1	—	—	—	—	1	1	—
16	1	—	1	1	—	1	1	1	3	1	—	1
17	—	—	—	—	—	—	—	—	—	—	—	—
18	—	—	—	—	—	—	1	—	1	1	—	1
19	—	—	—	—	—	—	—	—	—	1	1	—
20	—	—	—	2	2	—	1	1	—	3	2	1
21	—	—	—	—	—	—	1	—	1	—	—	—
22	—	—	—	1	—	1	1	—	1	2	1	1
23	—	—	—	—	—	—	—	—	—	3	3	—
24	—	—	—	1	1	—	3	1	2	1	—	1
25	—	—	—	—	—	—	2	2	—	1	1	—
26	—	—	—	—	—	—	1	1	—	2	—	2
27	—	—	—	—	—	—	—	—	—	—	—	—
28	—	—	—	—	—	—	1	—	1	1	1	—
29	—	—	—	—	—	—	4	3	1	4	1	3
30	—	—	—	—	—	—	1	1	—	1	1	—
31	—	—	—	—	—	—	—	—	—	1	1	—
32	—	—	—	—	—	—	3	1	2	1	—	1
33	—	—	—	—	—	—	3	1	2	1	1	—
34	—	—	—	—	—	—	2	—	2	—	—	—
35	—	—	—	—	—	—	2	2	—	—	—	—
36	—	—	—	—	—	—	—	—	—	—	—	—
37	—	—	—	—	—	—	2	1	1	1	—	1
39	—	—	—	—	—	—	—	—	—	1	—	1
42	—	—	—	—	—	—	2	—	2	—	—	—
43	—	—	—	—	—	—	—	—	—	1	1	—
45	—	—	—	—	—	—	—	—	—	1	1	—
46	—	—	—	—	—	—	—	—	—	1	1	—
49	—	—	—	—	—	—	2	2	—	—	—	—
50	—	—	—	—	—	—	—	—	—	2	—	2
52	—	—	—	—	—	—	2	1	—	—	—	—
53	—	—	—	—	—	—	1	—	1	—	—	—
58	—	—	—	—	—	—	—	—	—	1	1	—
60	—	—	—	—	—	—	1	1	—	—	—	—
72	—	—	—	—	—	—	—	—	—	1	1	—
75	—	—	—	—	—	—	—	—	—	1	1	—
78	—	—	—	—	—	—	1	1	—	—	—	—
84	—	—	—	—	—	—	1	1	—	—	—	—

[1] Schindelka.

The Vienna professor inoculated 503 horses with the powdered mallein of Foth, of which number 148 showed a reaction of 2° and upwards. All were found glandered on autopsy excepting one which suffered from chronic emphysema. Leclainche observed this in three cases of heaves, one indicating 2.1° and the other two 1.7° C. This has also been seen by Schmidt[2]. I have not been able to experiment in a heavy animal.

Rudovskey[3] injected forty-seven horses with .1 gram doses of dry mallein. Twenty-four were found to have glanders. In five of them the temperature was .4°, 1.2°, 1.5°, 1.6° and 1.8° C. respectively; in the remaining eighteen it varied from 2° to 3.8°. The highest reaction among the non-glandered was 1.85° C. in one; in two, 2.2°, but atypical; in a fourth 1.7°, typical, the horse suffering from pneumonia.

Szpilmann and Krwawiez experimented on twenty-one animals. Thirteen were found glandered; the temperature ranged from 1.6° C. to 2.9° C. Of three healthy horses the temperatures were, 1.6°, 1.7° and 2.2° (probably atypical). Among nineteen other horses, eleven being diseased, one showed a reaction of 1.6°, one 1.9°; the remaining 5.2° to 2.4°. All reactions were typical.

In a brigade of Russian cavalry of 700 mounts, fifty-five were found glandered upon autopsy.

Schnidler[4], chief veterinarian of the Seventh Hussars in the Austrian army, by order of the Austrian Minister of War, experimented on twenty-six horses during an outbreak of glanders, with the results in Table III.

Tables[5] III and IV show the result of twenty-six horses injected twice successively by Foth at an interval of about sixty-three days. It will be seen that the reaction of the second operation is generally less than that resulting from the first.

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[1] *Revue Vêtérinaire.*

[2] *Thierartz. Centraiblatt, Bd. 17, 1894, p. 152.*

[3] *Deutsch. Zeit. f. Their. u. Verg. Path.*

[4] *Oesterreich. Monats. f. Thierheil.*, No. 7, 1894.

[5] *Oesterreichische Monatsschrift f. Thierheil.*, July, 1894.

TABLE III.

No. of horse.	Normal temperature before injection.	Highest temperature.	Reaction.	Highest temperature after hours.	Normal again after hours.	Remarks.
1	38.0	40.4	2.4	15	—	destroyed, Oct. 6.
2	37.8	40.2	2.4	12	—	glanders.
3	37.7	39.8	2.1	12	—	destroyed, glanders.
4	37.6	39.4	1.8	10	19	" " (?)
5	37.6	39 5	1.9	14½	32	
6	38.2	40.	1.8	14½	30	
7	37.6	39.4	1.8	12	23	*Group I.* Very suspicious.
8	37.8	39.5	1.7	15	23	
9	37.8	39.5	1.7	10	16	
10	37.7	39.3	1.6	12	23	*Group II.*
11	37.6	39.2	1.6	12	23	Suspicious.
12	37.9	39.4	1.5	13	24	
13	37.7	39.2	1.5	10	19	*Group III.* Slightly suspicious.
14	37.9	39.3	1.4	15	23	
15	37.7	39.	1.3	15	21	
16	37.9	39.1	1.2	12	32	
17	37.8	39.	1.2	10	18	
18	38.2	39.3	1.1	14	19	
19	37.7	38.7	1.0	12	16	
20	37.5	38.5	1.0	10	16	*Group IV.*
21	37.9	38.9	1.0	12	19	Healthy.
22	38.2	39.1	.9	10	21	
23	37.6	38.5	.9	15	23	
24	37.6	38.4	.8	15	19	
25	37.9	38.8	.7	15	21	
26	37.7	38.3	.6	12	19	

Four were destroyed. The remaining twenty-two were reinjected December 6 to 10, with results in Table IV, as shown on next page.

M. Lequerriere[1], during 1893, injected thirty-four horses. Nine reacted as to temperature, local swelling and constitutional symptoms, one only showing 1.3 fever. Autopsy, glanders. Eight not reacting were destroyed, with negative results. In two the discharge ceased after the injection and the animal apparently recovered.

In the cavalry remount at Montaire (France) invaded by glanders in 1892, 228 horses were treated with mallein, fifty-eight affected with glanders gave a reaction of more than 2° C.; seventy-three suspected (reaction 1° to 2°), and ninety-seven healthy.

[1] *Recueil de Med. Vet.*

TABLE IV.

No. of horse.	Normal temperature before injection.	Highest temperature.	Reaction.	Highest temperature after hours.	Normal temperature after hours.	Remarks.
8	37.4	39.1	1.7	16	40	destr'y'd, emphysema.
6	37.7	39.2	1.5	22	38	negative.
11	37.4	38.9	1.5	14	38	
9	37.6	39.	1.4	18	28	
10	37.6	38.7	1.1	12	32	
5	37.7	38.7	1.0	12	32	
13	37.4	38.4	1.0	12	28	
14	37.5	38.4	.9	6	24	
7	37.7	38.4	.7	18	28	
12	37.8	38.4	.6	15	24	
16	37.7	38.7	1.0	6	18	
18	37.6	38.5	.9	12	32	
19	37.6	38.3	.7	12	21	
25	37 7	38.4	.7	14	24	
24	37.6	38.2	.6	8	16	
22	37.9	38.5	.6	8	16	
20	37.7	38.3	.6	12	21	
26	37.7	38.3	.6	6	16	
15	37.7	38.3	.6	6	18	
21	37.5	38.1	.6	6	21	
17	37.5	38.	.5	6	18	
23	37.7	38.2	.5	12	21	

I might continue to enumerate more cases and multiply statistics, but the general results are the same. Below I record cases on which I have used mallein. Some others thus treated I will not mention from lack of notes at my command.

Case I.—Sr. g.

August 22, 1893, 6 a. m., initial temperature . . . . . 37.8° C.
6 p. m., maximum . . . . . 41.1°
Reaction . . . . . 3.3°

Autopsy:—Tubercles in lungs and lobular pneumonia; ulcers in nasal m.m.

Case II.—B. g.

August 23, 6 a. m, initial temperature . . . . . 38° C.
8 p. m., maximum . . . . . 40.5°
Reaction . . . . . 2.5°

Autopsy, glanders.

In both cases, there was a slight nasal discharge, slight enlargement of the submaxillary lymphatics, general malnutrition.

Case III.—Br. g.

September 21, 12 m., temperature	40.5° C.
September 22, 12 m., temperature	38.9°
September 23, 9 a. m., initial temperature	39°
12 m., maximum	40.2°
Reaction	1.2°

Symptoms:—Malnutrition, lymphangitis near hind leg, corded lymphatics, abscesses, ulcers and enlarged inguinal glands. The reaction was not decisive on account of the acute condition and the previous high temperature, the system being already saturated with mallein and allied products. The symptoms in addition to the temperature warranted my diagnosis of glanders, confirmed by the autopsy.

Case IV.—B. g.

July 21, 1 p. m., temperature	38.2°
4 p. m., temperature	38°
9 p. m., temperature	38°
9 a. m., temperature	39° Injected.
12 m.	40.1°
3 p. m.	38.8°
6 p. m.	38.5°
9 p. m	38.4°

Symptoms:—Poor condition, nasal discharge, lymphangitis near hind leg, three ulcers, corded lymphatics, three ulcers around hock. The morning temperature of 39° I regard erroneous to be taken as the initial temperature and believe that the temperature of the previous day represents the true initial condition, making a reaction of 2.1 instead of 1.1° C.

Autopsy:—Glanders. Lesions in nose and lungs.

Case V.—Blk. m.

Discharge from left nostril; was trephined two months before, but discharge did not cease. July 21. Discharge and enlarged nodulated glands.

9 a. m., initial temperature	37.9° C.
9 p. m., maximum temperature	40.5°
Reaction	2.6°

Autopsy:—Glanders in nose and lungs. All the preceding cases had decided local reactions.

Case VI.—Gr. g., standing in stall next to Case IV.

July 22, 9 a. m., initial temperature	37.9° C.
9 p. m., maximum temperature	38.1°
Reaction	.2°

Very slight local swelling. No glanders.

Case VII.—B. g.

June 23. 9 a. m., initial temperature	39 2° C.
7.30 p. m., maximum temperature	41°
Reaction	1.8°

Symptoms.—Swelling near hind leg, ulcer external side of tibial region, cutaneous abscess on sternum. Temperature curve regular. Moderate local reaction. Autopsy, glanders.

Case VIII.—B. g., good condition. Had lymphangitis in off-hind leg off and on for three years; two ulcers, one on hock which healed with great difficulty, and the second above coronary band, ragged and discharging oily pus. No lameness.

June 13, 9 a. m., initial temperature	38.6° C.
6 p. m., maximum temperature	39.2°
Reaction	.6°

Not destroyed, but probably not glandered.

Case IX.—Cow affected with tuberculosis.

April 3, 6 a. m., temperature	100.9° F.
8 a. m., "	101°
2 p. m., "	101.1°
4 p. m., "	101.6°
8 p. m., "	102.5°
April 4, 1. c.c. mallein.	
6 a. m., temperature	101.8° F.
10 a. m., "	102.4°
12 m., "	102.4°
2 p. m., "	103.4°
4 p. m., "	103°
6 p. m., "	102.9°
8 p. m., "	102.6°
10 p. m., "	102.2°

Case X.—B. g. Worked as mate to No. 5 for several weeks. No symptoms. Condition good.

Initial temperature	37.7° C.
Maximum temperature	37.6°

Case XI.—B. g. Worked with same harness and bridle as No. 5. Had had shipping cold. Discharge from one nostril and enlargement of submaxillary lymphatic glands. All symptoms have since disappeared.

Initial temperature	38.1° C.
Maximum temperature	38.3°

In what respect are the symptoms which follow an injection of mallein indication of glanders?

What is its diagnostic value?

With the domestic mallein which I have employed, and I have seen this in experiments of others, I have considered a *typical* reaction of 2° F. and upward, with a decided local inflammation, and more especially if there be a suspicious symptom, always sufficient indications to make a positive diagnosis. If the reaction is atypical, no matter how high it may register, and if there be no local swelling, I would hesitate to pronounce the animal diseased. No. 3, Table I, had an atypical reaction of 3.1° C., but did not have glanders. In all such cases the animal should be reinjected after a suitable interval. In one rare case, given in a table before mentioned, the reaction was only .4° C. at the sixteenth hour, after which the temperature was not taken; in another one of my own, 1.2°. Post-mortem showed glanders. These are most exceptional and are due to carelessness, incorrect instrument, individual peculiarity, not taking the temperature for a sufficiently long period, or a superabundance in the blood and other tissues of mallein, which is produced by the bacilli at the seat of the disease.

We are safe in saying that a typical reaction of 2° C. and upward, with or without local swelling (though a swelling will make it more positive) is sufficient to condemn an animal; reaction of 1.5° to 1.9° is very suspicious, and many that are in this category suffer from glanders, which may be proved by a second injection. Between 1° and 1.5° C. there are some animals which are suspicious and should be reinoculated. Those registering below 1° (2° F.) can be regarded as healthy.

A thermic elevation of from 1.3° C. to 1.9° is by no means diagnostic. It may be registered by glandered and non-glandered horses. This depends upon the susceptibility of the individual and the toxic strength of the mallein. In a total of sixty-three horses showing this reaction, thirty-six were glandered and twenty-seven[1] healthy.

Reinjections.—Reinjections in animals in which the first reaction has not been conclusive, should be made at intervals of at least five or six days. If given in too close succession the action may be cumulative. A very high temperature may

[1] *Revue Vétérinaire.*

be the result, and may lead one to false conclusions. The longer the interval, the more positive will be the result. In healthy animals the reaction becomes less after each injection; in diseased animals it became more marked. Smaller doses can be used for the consecutive inoculations.

A word as to the *curative* value of mallein. Recalling the zenith of Koch's tuberculin, from which great results were anticipated in the treatment of tuberculosis, many have endeavored to adopt mallein to the same use. The chronic form of glanders is at present by many considered curable. Decroix and Bouzum[1] treated successfully cases of chronic glanders in Africa, especially when it manifested itself as farcy, with caustics, excision, iodine, etc. Brusasco, Tollovio and Salletta in this way cured in Turin twenty-five to fifty per cent. It is also admitted by Haubner, Dickerhoff and Bollinger. Babes claims to have seen it in horses and guinea pigs after several doses of mallein; also that the blood-serum of cattle has curative properties for glanders. Pilvavios[2] has cured eight glandered horses in the first stage of the disease with mallein injections at intervals of eight days. Semmer and Itskovitsch have seen one case of spontaneous cure. Helman cured one horse and produced immunity with repeated subcutaneous injection of the lymph. This animal was several times inoculated with glandered material with negative results and no reaction with mallein; after inoculation with a large quantity of glandered material, a local abscess was produced and the animal reacted with mallein, but only until the abscess was opened.

Semmer with the blood-serum of this horse partially destroyed the susceptibility of cats and guinea pigs toward glanders. Blood-serum from horses having immunity weakens and finally destroys the virulence of the bacillus.

In the Montoire outbreak some of the horses which had reacted 2° and more gave but little reaction a month afterward. Some of these which were at the first injection pronounced suspected, showed at the second injection no reaction.

In the 230 horses of the Russian cavalry in good condition which reacted, 184 were kept under observation without any augmentation of the symptoms. The fact that the symptoms

[1] *Deutsch. Zeit. f. Thier. Med.*, Bd. 20, p. 59.
[2] *Berl. Thier. Wochen.*, 1893. No. 20.

ameliorate themselves after an injection of mallein and the reaction is less marked after successive injections does not necessarily imply that the animal has been cured of the disease. As I have said before, we will find some irregularities in the temperature in healthy horses, due to the dose, idiosyncrasy, atypical temperature curve, etc. The fact that these animals did not show any glanderous symptoms for a long time is again no proof of the absence of the disease. I agree with Leblanc that an animal which is affected with true glanders very rarely recovers and that in these so-called latent forms one would find chronic or perhaps the chronic and the acute in some of the organs.

Again, errors may arise by mistaking glanders lesions for those of a different nature, such as old foci of a bronchopneumonia or the fibrous nodes which are caused by parasites or emboli in the blood vessels.

The glanders tubercle is: (1) A tubercle with a white opaque centre surrounded by a grayish white border and a hæmorrhagic areola. (2) A tubercle having either a central caseous point or a calcareous substance and the same characters as the preceding; grayish border and hæmorrhagic areola.

Non-glanders tubercle: Translucid tubercle or lymphadenoma, soft, homogeneous, deprived of gray border and hæmorrhagic areola.

The lesions of the first category are permanent; nothing permits us to say the same of those of the second. (Leblanc.) Schindelka has experimented on several horses suffering from strangles with suppuration lesions, but in no instance has he found a rise in temperature which could be mistaken for that from glanders.

There is said to be a curable form of glanders in Southern Russia which is transmissible, but of a very mild type. I can not speak with positiveness on this point, but as the disease exists there almost permanently, the animal may acquire a certain amount of immunity.

M. Bonome reports in the *Récueil de Med. Vét.*, July, that he has used mallein in treating glanders in man by injecting 1.15 to 1.20 a milligram. Bonome claims to have had good results in the horse by preparing his mallein from the blood and the organs of a glandered cat, being imbued with the idea that the bacillus of glanders becomes attenuated in passing through the

system of the cat. Nocard and Schindelka (loc. cit., p. 186) also admit that in the first stages it is curable, and in fact most experimenters admit it. If glanders is curable it is by all means the exception, and the subject requires much more proof than we have at the present time.

The Swiss Department of Agriculture has appointed a commission to formulate regulations for the use of mallein.

"All horses, asses, and mules belonging to a stable or other aggregation of horses among which glanders exists shall be subjected to the use of mallein.

"All horses suspected shall be likewise treated in the same manner.

"Their value shall be estimated before the injection. The compensation for all horses thus killed and found glandered shall be one-fourth of their appraised value. If the animal is not found glandered its total value shall be paid to the owner."

Such a procedure initiated by a foreign government is very timely and is worthy of consideration by other countries. In the end, this is the most complete and cheapest method of eradicating this disease, especially in standing armies.

From the previous remarks what conclusions can be drawn? How much confidence can be placed in the use of mallein in the diagnosis of glanders?

1. That glandered horses react;

2. That those not glandered as a rule do not react;

3. That after the injection of .06 to .1 gram of dried mallein or 1 c.c. of the liquid product, a rise in temperature of 2° C. with a typical course is a positive reaction; these horses must be considered glandered.

4. That an elevation of 1.5° to 1.9° with a typical course is an uncertain reaction. Animals in this category *may* be glandered and should be reinjected;

5. That 1.5° with a typical course is the least elevation that can be considered a reaction, strengthened by local and general signs. Like the preceding they should be reinjected;

6. That 1.4° C. or less is no reaction;

7. That local and general symptoms are corroborative of the thermic alterations, but their absence sometimes occurs.

8. That any temperature whatsoever that is atypical is no reaction, unless accompanied by local and general symptoms.

9. That in excessively rare cases of glanders the thermic elevation may be less than the standard ;

10. That if properly employed and interpreted, mallein is an invaluable agent in diagnosing glanders and should be in the possession of every veterinarian ;

11. That the curative properties of mallein are still in abeyance.

205 North Twentieth Street, Philadelphia, Pa.

CONTRACTION OF THE SOLE: CAUSE AND TREATMENT.

By Dr. John W. Adams and Franz Enge,
Veterinary Department, University of Pennsylvania.

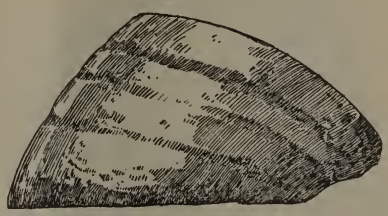
We take the liberty in this number of the Veterinary Magazine of discussing this comparatively rare pathological condition, and since it causes a lameness which may easily be mistaken for that of navicular arthritis, rheumatism or for "shoulder lameness," we trust its importance will make it acceptable to the readers of this periodical.

Very few observations concerning contracted sole have been published and there is reason to believe that it has been only infrequently recognized. It rarely, if ever, happens that this contraction of the sole is confined to one foot alone ; both fore, or both hind feet being usually affected at the same time. On superficial inspection the quality of the horn and the form of the hoof involved will be found to be good, the hoof to be well rounded and the frog normally developed ; and if no other defects are present, the examiner is apt soon to turn his attention elsewhere in his search for a cause of the lameness. The lameness, of itself, is not clearly pathognomic of the condition, but closely resembles several lamenesses due to other causes. The animal travels as though its feet were *sore ;* the stride is shortened both by an unwillingness to reach forward the normal distance with the foot, and especially by taking the foot from the ground very soon after the limb has passed the vertical position in its phase of contact with the ground. Observed

from the side the animal is seen to stand, as in laminitis, with the affected feet slightly in advance of their normal position, the heels bearing more than their due proportion of the body-weight. At a trot the feet are carried close to the ground, moved with care and set down with manifest reluctance. Indeed, sometimes the animal can only with great difficulty be induced to move, and since this also often happens in the course of rheumatism, and the so-called "shoulder lameness," it comes to pass that the cause of the lameness of the contracted sole is seldom sought for in the foot. This peculiar gait will occur both over hard and soft surfaces, as a rule most markedly over the latter, though occasionally a hard surface will cause the greater lameness.

If, however, a hoof having a contracted sole be closely observed from one side, it will not be difficult to perceive that it has undergone a peculiar change of form (vide Fig. 1). At the toe the surface of the horn no longer even approximates a straight line from the coronet to the plantar border, but rather an arc of a circle whose centre is somewhere behind and below the heels. This convexity at the toe is due, as we shall see, to a drawing inward toward the point of the frog of the entire plantar border of the wall. The profile of the heel is nearly a straight line, as it should be, but instead of being parallel to the profile of the toe, as in the normal foot, these two lines if prolonged downward a foot or less would intersect—presupposing, of course, that these lines lie in one and the same plane. This convergence of toe and heels is very apparent in Fig. 1, which is an exact reproduction in outline of a hoof in our collection. The "buttresses" are drawn forward toward the middle of the sole, and the "glomes" of the heel hang backward far beyond their base of support. This approaching of heel and toe shortens the antero-posterio diameter of the plantar surface of the foot, and produces an elevation of the coronary border of the sides (mammæ) of the hoof. The sole

FIG. 1.

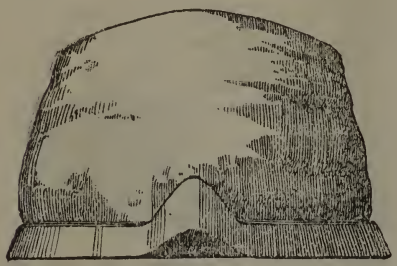


Profile view of a hoof whose form has been altered by contraction of the sole. Right fore hoof seen from the inner side. (From a photograph.)

will be found to be excessively concave, hypersensitive under pressure, especially for a short distance about the point of the frog. It may be of interest to reflect that the changes of hoof-form in contracted sole are exactly the reverse of those occurring in chronic laminitis.

The causes of this condition are various. Improper shoeing may assist in the contraction of the sole, especially if the process has already begun. A shoe, the upper surface of whose branches slopes downward and inward is especially favorable to this disease, as may be easily explained. When weight is placed upon the unshod foot resting upon a level and moderately smooth surface, three ultimate factors unite in producing an expansion or increase in circumference of the entire plantar border of the wall, viz., the lateral expansion of the elastic tissues in the posterior portion of the foot (plantar cushion, horny frog, etc.); the flattening and consequent broadening of the concave sole under the descent and backward rotation of the third phalanx, and navicular bone, and, finally, the tendency, at least, of the plantar border of the wall, from one quarter around the toe to the other, to glide outward from the centre of the sole, and thus either to offer an insignificant resistance to the expansion of the descending sole, or actually to draw upon and assist the sole in expanding. The greater the obliquity of toe and sides of the hoof to the supporting surface the greater this expanding force under the weight of the body. If now this obliquity of the wall to the surface of a *shoe* be *lessened* by sloping the upper surface of the branches downward and inward, thus placing the upper surface of the shoe more nearly at right angles to the direction of the horn tubes, the third factor is diminished or even abolished. Indeed, such a funnel-like surface of a shoe may actually oppose the expansion of the plantar border of the wall and sole, compressing the latter

FIG. 2.



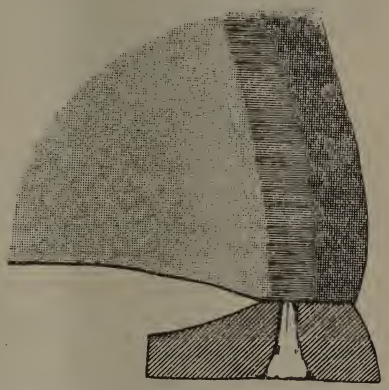
Anterior view of left fore hoof affected with contracted sole, showing the outward slant of the edge of the shoe and the turning inward of the infero-lateral portions of the wall. (From a photograph.)

from its border toward its centre; especially does it favor a squeezing together of the heels.

More active causes than faulty shoeing are: *excessive drying out of the horn; unreasonable thinning of the sole* and, *an inordinate thickness of the horny wall in proportion to the size of the foot.* That shoeing is not the only cause of this condition is proven by the fact that contracted sole is observed not only upon the shod, but also upon the unshod animal.

The preparation of such a hoof for the shoe consists in shortening the toe as much as possible, so as to remove weight from the quarters and buttresses, which have been drawn inward and forward under the heels. Under no circumstances apply the rasp to the outer edge of the plantar border of the wall, because, by reason of the change in form of the hoof, the circumference of this plantar border has already been too greatly diminished. This deficiency in the spread of the hoof we should supply by the application of a shoe whose outer edge is bevelled outward, so that the ground surface of the shoe will be somewhat wider than the bottom of the hoof (vide Fig. 2). A cross-section of a branch of such a shoe and a part of the wall above is shown in Fig. 3. In this illustration it will be noticed, that by reason of the outward slant of the outer border of the shoe, the "fullering" must be "coarse," *i. e.*, placed well in from the edge of the shoe, so that the nails may fall exactly upon the "white line." A cross-section of a branch of an ordinary shoe in proper position under the wall is represented in Fig. 4. The shoe represented in Figs. 2 and 3, may be further improved by drawing up clips at the ends of the branches to press outward against the bars, and thus mechanically assist in the expansion of the heels. It will

Fig. 3.

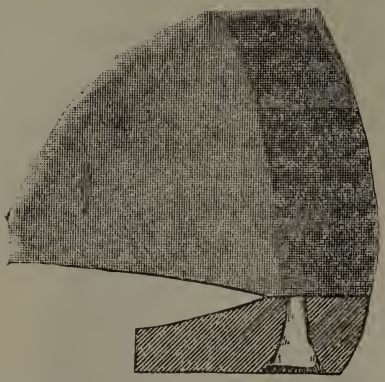


Cross-section of a branch (through nail hole), of the shoe shown in Fig. 2. Notice the outward slant of outer edge of shoe and the consequent "depth" at which the "fullering" should be placed. (Half schematic.)

then be practically a Defay's shoe, and while upon the foot should be spread weekly.

The good effects of this method of shoeing are shown by an immediate and decided improvement in the animal's action. The gait becomes freer, and continues to improve as the normal softness and elasticity of the horn are restored by soaking, poulticing or other means. In order to avoid a subsequent drying out of the sole and a recurrence of the lameness, we must see to it that the horn is always moist, and prevent the rapid evaporation of this moisture from the horn by a judicious use of a good hoof ointment—there being probably none better than ordinary petrolatum or cosmoline. A complete restoration to perfect health is not unattainable, and will be more probable if the afflicted animal be turned into a pasture for a few months, though even there the hoof should be attended to, the wall kept properly shortened and balanced, and the frog and sole allowed to grow unmolested.

FIG. 4.



Cross-section of a branch of an ordinary shoe (through nail hole), in position under the wall of a foot having a contracted sole. Note differences between Figs. 3 and 4 in respect to outer border of shoe, and "depth" of fullering. (Half schematic.)

3423 Walnut street, Philadelphia.

CLINICAL REPORTS.

A GENUINE CASE OF DIPHTHERIA IN A DOG.

By Arthur S. Wheeler, V. M. D.,
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Now is the time in which the veterinary fraternity should be on the alert to carefully record the diseases which are common to the lower animals and man. For this tracing out of the relationship of the diseases of lower animals to man is one of the most interesting, important and fruitful problems of our professional work. Its solution will lead us aside from the sordid struggle for the "almighty dollar," bear us above a largely commercial plane, into that highest and noblest sphere of human effort—the alleviation of human suffering and the saving of human life.

However, in asserting the identity of diseases of man and lower animals, too much stress cannot be placed upon the importance of a positive and conclusive diagnosis. We read every day of the communicability of typhoid fever, scarlatina, cholera infantum and tuberculosis from meat and milk supplies to man, and yet no systematic effort has yet been made to determine the percentage of cases which are traceable to the meat and milk supply, or to the cohabitation of man with the dog, the cat, the cow, etc. Of course, the water in use at dairies is supposed to play an important rôle in perpetuating these maladies, and such is only reasonable to believe.

We know thoroughly the life history of many of the tæniæ. There is from time to time some excitement over trichina; typhoid fever outbreaks have been traced to dairies, etc., and yet what the scientific world would accept with greater credence than these occasional eruptions of sporadic cases, would be the carefully recorded statistics covering a period of some length.

On the morning of May 11 (Saturday), 1894, I was called to see a three-year-old rabbit hound, which presented the following symptoms: There was an expression of great pain; animal greatly dejected, and showed desire to hide beneath the house.

On closer examination, I found a bloody diarrhœa, temperature 103°, and drewling from the mouth. Upon opening his mouth, which was so sore that the poor beast struggled violently to defeat my purpose, I discovered inflammation of the entire oral mucus membrane, tongue swollen and red, and gums bleeding around the edges of dental alveoli. I could, however, discern no evidence of membranous patches. The dog being unable to eat or drink, my prognosis was unfavorable. Although I had never seen a case of diphtheria in the dog, my suspicions were at once aroused.

Seeing several small children in the yard, I questioned the owner of the dog, asking him, if any of those little ones had been sick during the past month. At first he said "No"; but on cross-questioning him, he told me that his little boy about five years of age had had an attack of croup two weeks prior to that time. This strengthened my suspicion as to the nature of the dog's sickness.

History—Sunday, May 5—Dog was first taken sick with loose bowels; on Wednesday became bloody.

Thursday, May 9—Slobbering started.

Saturday, May 11—I saw the case.

Monday, May 13—Dog died.

After leaving very stringent orders about isolating the patient from the children, etc., I repaired to the nearest drug store where the culture tubes for diphtheria were kept by the Board of Health, and returned in a few minutes to my patient and made a gelatin culture from the posterior part of his mouth. This culture was sent to the Bacteriological Laboratory of the Board of Health, and pronounced by Dr. P. E. Archinard, (Bacteriologist) as unquestionably diphtheria. Unfortunately, I was compelled to be absent from the city on Sunday, and when I returned Monday morning, the dog was dead and had been removed, which prevented my making a post mortem.

The slide prepared by Dr. Archinard from my culture was by far the finest specimen of Klebs Loeffler bacilli I ever saw.

A day or two after my patient died I called on the physician, Dr. B——, who had attended the child supposed to have been sick with croup. He very kindly gave me the symptoms of the case, as follows:

He said he had been summoned about two weeks prior to my visit to the dog, at 11 P. M. He found the child breathing

with difficulty, slightly cyanosed, hoarse, a metallic cough, no fever, no inflammation next morning or subsequently. He had been treating the family for a year and practicing in the neighborhood. There had been no diphtheria or croup in the neighborhood during that time.

The evidence here would tend to show that we are not warranted in affirming any connection between the dog's sickness and the attack of the child.

The important lesson we learn from the above is the value of having culture tubes distributed over all the larger towns and cities, for the ready use of physicians and veterinarians, and the establishment of free laboratories easily accessible to the public.

Furthermore, our local Board of Health has decided to place an additional sterilized tube in these diphtheria boxes, in order that the practitioner may send a sample of milk with the culture, for bacteriological examination, from every household where there is a case of diphtheria.

It is by the adoption of such methods alone that valuable and accurate information can be obtained showing the exact relations of the diseases of man and the domestic animals.

I trust that in a few years the veterinary profession will be prepared to assert not simply that diphtheria and consumption are capable of being transmitted from the lower animals to man, but will be able to corroborate this statement by dint of figures, and with the incontrovertible evidence of the careful record of cases.

REPORT OF AN OUTBREAK OF ANTHRAX IN ERIE COUNTY, PA., IN WHICH CATTLE AND HORSES WERE AFFECTED.

By Dr. J. B. Irons.

[Read at the semi-annual meeting of the Pennsylvania State Veterinary Medical Society, Harrisburg, September 4, 1894.]

I do not expect to report these cases in detail, as I was not called in time to see all of the animals alive. On the thirtieth of May, 1894, Mr. Scott, of West Springfield, Erie Co., Pa., came to my office in Erie, Pa., and said that two of his

yearlings, one two-year-old and one cow had died during the last twenty-two days, and there was one more sick. From the description given, I thought the trouble was anthrax. He said that in the pasture of five or six acres there was a swamp of one-half to three-quarters of an acre, and when the rains were frequent they went there for their water. In a dry time the swamp dried up. Thinking it likely that this swampy place was the origin of the trouble, I recommended a change of pasture, and this he said he would do; I also gave him a quantity of hyposulphite of soda to be given in from one to two ounce doses twice a day, and a thirty per cent solution of creolin to be given alternately with the hyposulphite of soda. He sent reports before the seventh day of July that the rest of his herd was all right, and doing well.

July 9 I received a telegram requesting me to come to Springfield on the first train. Upon my arrival at twelve o'clock, found one of his team horses dead, a nice large five-year-old gelding in fine condition, that had been in good health until noon the day before. He died at 6.30 p. m., the eighth, six hours after he was known to be ill. Mr. Scott gave me the following description of the horse: Some time after he had taken his cattle from the pasture and had his spring work done, about June 28, he turned his horses out in the pasture where the cattle had been. The horses did nicely on the fresh pasture, and on the eighth day of July he drove this horse about three miles to church and tied him in the shade, as it was a very hot day. In about one hour and a half he went to get him and found him all covered with an eruption on the neck, abdomen and upper portion of the legs. He called the attention of several of his neighbors to the blotches, and they said that was nothing dangerous, as they had often seen other cases of a like nature in which the blotches disappeared in a few days. When he started home the horse was somewhat stupid, seemed to be dull, and walked as if very weak and greatly prostrated, with a staggering gait. He was put in a stall and his head hung on the manger. When led out into the yard, under a shade tree, he lay down, and would nibble at the grass but did not eat any. After dinner he seemed to be in great distress, so he was put in a stall and a country horse doctor was sent for (as it was Sunday and he could not get me). The practitioner said that it would amount to nothing,

as he had seen a number of such cases, and to give him a good cathartic, and he would be all right in a day or two. The horse soon went down and could not get up, his head and neck were swollen (the eruption did not show); and on rubbing the hand over his neck it sounded as if paper was under the skin. The left hind leg was paralyzed for two or three hours before he died. An attempt was made to bleed him at the mouth, but blood would not flow in any amount. The horse would break out in sweats, and seemed to be in great distress, and struggled very hard when dying. Eighteen hours after the death of the horse, I was called and made an incomplete post-mortem examination. The day was very warm (ninety-two in the shade) and it was not a fit subject to examine very closely, for the carcass was swollen out of all proportion. On removing the skin, the neck showed a large amount of extravasated blood in the areolar tissue, and the same was seen over the large gluteal muscle of the left hip. The blood was black and tar-like in appearance. The spleen was rather large and very soft and tender; it would hardly hold together to lift its own weight. From the history and post-mortem appearances I decided this to be a case of anthrax. One of Mr. Scott's neighbors who undertook to bleed the horse in the mouth was unable to get much blood, but scratched his finger on a canine tooth, hardly breaking the skin. The finger became swollen and involved the hand and arm to such an extent that his life was despaired of for several days; but, luckily, it terminated in the loss of a portion of the finger and three weeks' sickness.

On August 10, I received a dispatch from Mr. Scott to come on the first train. On my arrival I found the other horse sick. He is a six-year-old gelding, weighs 1250 pounds, a good strong horse and in good condition. It was then five hours after the first symptom of disease had been observed. The animal appeared dull, and walked with a staggering gait; the lymphatics of the groin were swollen; there was considerable eruption on the lower surface of the body, neck and legs; they felt like extravasations of fluid into the areolar tissue and were sensitive to pressure with the hand. The tumors were nearly all the same size on neck and body, but were swollen on the legs. A few on the fore legs had been torn open by the horse's teeth. Temperature, 103.5°; pulse 52, small and wiry. The

skin showed no abnormality but the eruption, where the hair stood up as though it wanted to turn the wrong way. Loss of appetite, mucous membranes of eyes and mouth of a yellow reddish color. From these symptoms and my knowledge of the former case, I diagnosed anthrax, and gave the following treatment: Four ounces of hyposulphite of soda in one pint of water, and hypodermic injections of carbolic acid in the cervical region, and a twenty per cent solution of creolin in several of the larger eruptions. Those that were open on the legs were dressed with a solution of creolin. I left directions to give two-ounce doses of hyposulphite of soda, and some twenty per cent solution of creolin alternately every six hours. The first four doses were given three hours apart. I have received two letters, saying the horse is well, so far as the owner can tell.

Upon looking the premises over, I thought the trouble came from a well in the barn yard that was ten feet deep and lower than part of the barn yard, and within ten or twelve feet of the lowest place in the yard. It was found that the outbreaks always occurred five to eight days after a hard rain, so I advised the well pumped dry, a drain cut from the lowest place in the yard, and a strong solution of creolin put in the well, and repeated every few days, especially after a rain. I hope this may be of some interest to the Association, as it is the first anthrax I have ever seen in the horse, although I have often seen outbreaks among cattle.

THREE CASES OF INOCULATION WITH THE ACTINOMYCES.

Case I.—Cow, June 11, '93. Introduced a small piece of the actinomycotic tumor under the skin of the left shoulder, abdomen and thigh. No local alterations. June 24, autopsy negative.

Case II.—Calf six weeks old. Inoculated like case 1. Very slight temporary local swelling and at one point an abscess. July 20, autopsy negative.

Case III.—Calf inoculated on the left masseteric region and the neck. Each point became the seat of a small abscess, which, like the preceding, discharged laudable pus and healed

kindly. Also made an intra-peritoneal inoculation, introducing pieces of the tumor through the canula of a trocar.

The autopsy about two months afterward showed a large number of oblong nodules about the size of a hazel-nut on the great omentum. A microscopic examination revealed in them the presence of the actinomyces. Other organs and glands normal.

The genus actinomyces which is probably identical with the streptothrix, comprises, according to Dr. G. Gasperini, some eighteen parasitic organisms, the most of which are but incompletely known. He distinguishes four varieties or species in the actinomyces bovis. The *actinomycis bovis* probably is concerned in the ordinary forms of actinomycosis; the *act. bovis farcinicus* is the agent of the farcy of the ox studied by M. Frocard; the *act. bovis albus* is especially found in the external media, such as the air, earth, water, forage, etc.; it exists in certain cases of the disease in the ox and in the abscess in the dog; the *act. bovis luteo-roseus* is only a variety of the *act. bovis sulphureus.*

He concludes that the actinomycomata of the ox which can not be differentiated by their clinical and anatomo-pathological characters can nevertheless be produced by different varieties of the parasite; that the presence of the club-shaped bodies at the periphery of the tuft is in direct relation with the slowness of the pathological process and with the predominance of the neoplastic type; for the same actinomyces characteristic of osteo-sarcoma of the jaw does not become club-shaped at the points where it gives rise to the formation of abscesses; that according to the organs involved or the animal affected, the actinomyces produce sometimes one, sometimes another of the diverse pathological growths, such as pseudo-tuberculosis, abscess, neoplasms similar to sarcoma, granuloma, etc.

EXCISION OF THE CLITORIS.

EDITOR OF THE VETERINARY MAGAZINE:

I was called to attend a mare that became very irritable when in heat; in fact, was so dangerous that the owner would not allow her to be hitched during this period. He was of the opinion that her ovaries were diseased and should be removed.

I suggested the removal of the clitoris, and, with his consent, cast the mare that afternoon, anæsthetized her with chloroform and removed the clitoris with a thermo-cautery. The second day after I visited my patient, and to my surprise she was perfectly quiet and docile, and allowed me to dress the wound, which was done every day after. I may say that prior to the operation the animal always kicked violently when anything touched her quarters. She is now as gentle and reliable as one could wish ; has stopped that annoying and ceaseless switching of the tail, and may be driven at all times. Needless to say that both the owner and myself are well pleased.

W. G. Hollingsworth, D. V. S.

Utica, N. Y.

TRANSLATION.

OVARIOTOMY AND TORSION OF THE UTERUS.

By S. J. J. Harger, V. M. D.

[From the *Rec. de Méd. Vét.*[1]]

These *memoires* are prize essays reviewed by the Commission d' Obstetrique of the Sociétié Centrale de Médecine Vétérinaire, of Paris. The results of the author appear to have been very favorable and the papers received a favorable recommendation from the commission. The first treats of ovariotomy in the cow.

M. Flocard has, since '1879, performed more than 3500 ovariotomies. From April, 1879, to September, 1888, he has done the operation 1953 times and according to the classical method, by torsion and crushing. Nine cases terminated fatally: one case of purulent peritonitis, one of tetanus, and seven of secondary hemorrhage occurring from the third to the eleventh day. He had 150 temporary accidents, such as abscess, peritonitis, and return of the nymphomania. In this series of operations, representing such a large number of animals, the mortality has been only five per 1000 and the operative complications eight per cent. Antisepsis has been practiced in each instance. By comparing these statistical figures with those furnished by M. M. Charlier and Mansuy, which indicate a mortality of 35 to 40 per 1000, one can readily perceive progress in the technique of the operation. The author believes that antisepsis has played the principal rôle in lowering the mortality. (Skillfulness from practice must not be ignored.) In order to supplant the ecraseur and other torsion instruments which to him were unsatisfactory, the author has invented for this purpose a special instrument that has given him much better results.

[1] Two memoires, by M. Flocard, Geneva.

"The *ovariotome* is a sort of an ecraseur destined to make a complete section of the ovarian pedicle not by crushing but by compressing and constricting it as much as possible and then making a clean section at a point below the parts compressed. This instrument acts as a temporary ligature followed by a clean section.

"It is about .45 m. in length. It consists of a hollow steel tubing having at its posterior part two spurs or wing-like ratchets and is split from one end to the other by a fissure through which slides the nut of a screw that moves in the interior of the tube. The anterior part of the tube is attached to the sheath of an ecraseur. The nut of the screw catches in a shoulder on a rod of steel which at its anterior extremity receives the ends of an ecraseur chain and draws the chain into the interior of the sheath. The latter is slightly bent and flattened at its free extremity. On the right side of this end is attached a small guillotine which makes section of the pedicle.

"The anterior opening of the instrument is flat and widened laterally to permit the compression of the tissues in every sense. The anterior border is carefully rounded so as not to cut; the posterior, against which the blade of the guillotine slides, is sharp."

Operation.—"The animal is restrained with the right side against the side of the stall and maintained there by means of two bars or rails placed obliquely under the chest and the abdomen and held there by assistants or supported at their end against the rafters of the ceiling. The head is attached short and firmly at the usual height. The tail is carried to the right and held on the back by an assistant on the left side who also prevents flexion of the back. The vulva and the surrounding regions are washed."

The external genitals of the cow, as well as the arm, hand, and nails of the operator are thoroughly cleaned. The interior of the vagina is also washed with a solution of creolin in this way: The hand held in supination so as to form a funnel and holding some of the antiseptic solution, enters the lips of the vulva and is passed to the extreme bottom of the vagina, and the mucous membrane as well as the bottom of its numerous folds is thoroughly washed out. This is repeated three or four times.

The incision is made into the usual classical place, immediately above the neck of the uterus and on the median line, save in those instances in which the vagina presents a special conformation at its anterior extremity. Frequently, especially in old cows, the bottom of the vagina is dilated transversely so as to constitute two special lateral culs-de-sac separated by the neck. If one of these culs-de-sac be longer than the other, the axis of the vagina, according to the author, is deviated, and most often toward the right side. The latter fact is explained by Moussu by the oblique position of the gravid uterus in the right flank during the period of gestation.

When the axis is thus deviated the operator very justly claims that the incision should not be made on the median line, but rather in the axis of a line situated between the two culs-de-sac and indicated by an oblique salient fold extending from the bottom of the vagina to the uterine neck. Nevertheless, the normal raphé is sometimes misleading when the dilatation of the bottom of the vagina is such that it seems to be no more than a cul-de-sac above the neck, and when the sac seems to extend perpendicularly from the vaginal walls. In this case, says the author, the incision must be made in front of the neck and at the bottom of the sac.

The ovaries are extirpated as follows: "The right ovary is grasped between the index and medius of the right hand previously washed and dipped into the solution. With the left hand the ovariotome, with its chain concealed and dipped into the solution, is introduced into the vagina obliquely from above to below, and passed along the forearm until it reaches the palm of the hand. The wing-like rachets are compressed and the chain drawn out sufficiently to be passed around the ovary. * * * The chain is rapidly tightened and about a dozen half-turns made, the subsequent half-turns being now made in the following order: count ten, turn ten; count fifteen, turn sixteen; then count and turn twenty, twenty-five, and thirty, respectively; then always thirty until the limit indicated by the graduation of the instrument, as well as the cessation of the resistance, which should coincide with the former indication. Then set the guillotine, cut the ovary, and replace the former into its position; make a half-turn, count 100, then quickly loosen the chain and push it back with the left hand and open the loop with the right. If the section is

incomplete it must be completed with the thumb-nail. The same procedure is necessary for the opposite ovary, without removing either the hand or the instrument.

* * * * * * *

"The total duration of the operation is from ten to fifteen minutes."

From October, 1888, until December, 1893, the author practiced 1467 ovariotomies without a fatal accident. Two abscesses and three recurrences of nymphomania required a second operation with a successful termination. He terminates his memoire by referring to the particular advantages of crésyl in this operation, the employment of his ovariotome, the results, etc. It is evident, in order to attain such results, that the most absolute antisepsis is necessary, and for this purpose crésyl, in view of emulsifying and emollient properties, is the most valuable of the antiseptics, all of which are more or less irritating.

The commission believe that the ovariotome offers several advantages, among them being a minimum possibility of injury to the ovarian pedicle and the ease with which the extirpation can be accomplished.

The author has practiced ovariotomy in various dairies; in general, the period of lactation has continued for two years and the milk was secreted in greater abundance and of a richer composition. In one case, the lacteal secretion continued for six years and at the end of this time the daily yield, which before was twelve litres, had fallen only to nine litres.

In these establishments tuberculosis has disappeared, although as the author judiciously remarks, this may have been due to an increased vigor and better hygiene. He has witnessed subsequent to the operation the reappearance of menstruation and even pregnancy. These phenomena were due to a small portion of the ovary being left in situ; a second operation has always been a permanent cure.

The second *memoire* treats of the reduction of torsion of the pregnant uterus of the cow by instrumental means in those cases in which rolling of the animal fails.

The instrument consists of a hard piece of wood about twenty-eight inches in length and two inches in diameter, fastened at one end to a cross-piece about fifteen inches long, the whole forming an inverted T. About four inches from the

free extremity the long piece is perforated obliquely by two holes two inches apart. Two hemp ropes four feet long, two-fifths of an inch thick, with a slip-knot at one extremity complete the instrument.

Operation.—If one hand can be introduced through the torsion, the operation is easy. Each fore-member is secured above the fetlock with the loop at the end of the rope, the other end protruding through the vulva. The free ends are passed through the two holes in the end of the instrument, the right to the left and vice versa. The end of the long piece is now passed into the vagina and pushed into the uterus, the operator's chest pushing against the cross-piece and the hands making forcible traction on the ropes until the instrument is in contact with the members when the end of each rope is tied to the cross-piece.

The direction of the torsion being determined, the movement of the instrument must be in the opposite direction. After repeated rotary movements, the hands grasping the cross-piece, the reduction can be finally accomplished.

The author also mentions two cases of torsion successfully reduced by laparotomy on the right side.

ABSTRACTS.

IMPERMEABILITY OF THE HEALTHY MUCOUS MEMBRANE OF THE BLADDER IN RELATION TO DRUGS AND POISONS.

According to MM. Boyer and Guinard, the vesical mucous membrane, when it is intact, is absolutely impermeable. This fact has been demonstrated classically, many times, although it was recently doubted by Bazy. Boyer and Guinard in over twenty experiments confirmed the views of the physiologists. Ligating the ureters and the urethra, they injected toxic doses of hydrochlorate of strychnia into the bladder with a fine canula. The symptoms developed and the poison was found in the urine after removal of the ligatures. Similar results were obtained with other alkaloids.—*Revue Vétérinaire*, August, 1894.

MELANOSIS IN A CALF.

M. P. Coremans, principal veterinary inspector in the abattoir of Cureghem, reports that on the second of February, 1894, he examined a pied-red male calf, three months, with the following lesions :

1. The lung was disseminated with black nodes generally disposed over its surface in the form of quadrilateral islands measuring about one centimetre. These spots were also seen on section of the lung which otherwise preserved its normal coloration. They penetrated into the substance of the lung for about a centimetre and were therefore not entirely superficial.

2. The bronchial ganglia presented black arborizations in their cortical layer.

3. The visceral layer of the pericardium presented a blackish coloration.

4. The liver was the seat of lesions similar to those of the lungs. All the other viscera were normal and the condition of the animal was good.—*Annales de Méd. Vét.*

CONTAGIOUS PERI-PNEUMONIA OF THE BOVIDA IN SENEGAMBIA.

M. Monod, a veterinarian in Soudan, in a recent memoir says that this disease exists to a great extent in Africa and that its dissemination is very much favored by the migratory habits of the inhabitants. It causes considerable loss. The Mohammedans have recourse to preventative inoculation which they practice at the tail, the ear or the forehead. The last location is selected most frequently and gives the best results; an incision of from five to ten centimetres in length is made upon the forehead with a crude instrument which from carelessness may penetrate into the periosteum. Under the influence of the irritation the periosteum becomes inflamed and at the end of a certain time a bony deposit takes place which afterward becomes covered with horny tissue. This horny production has been mistaken by Dr. DeRochebrune for a true horn which has led him to distinguish the "*Bos Triceros Senegambia*," which has been the subject of several communications to the Academie des Science. The author has voluntarily consented to produce in this manner the *triceros* and, if need be, the *quatriceros.*—*Revue Vétérinaire.*

CAN ONE ACQUIRE GONORRHEA FROM A PERSON WHO HAS IT NOT?

Morel-Lavallée (*Annales des Maladies des Organes Génito-Urinaires*, December, 1893, p. 905) has an article with the above heading. He gives a case in which a husband, wife, and *amoroso* were involved, and submits the following conclusions:

Viewed clinically: (1) The morbific agent of gonorrhea may rest latent for months, or even years (in one of his observations six years). (2) The blennorrhagic virus may, in woman, remain absolutely latent for three or four weeks and still preserve its full virulence.

Viewed socially: it is inadvisable to permit marriage in a man who has the slightest drop of discharge until it has been proved by the tests of Neisser (nitrate of silver) or bichloride of mercury, or beer (Janet), to be aseptic.

Viewed bacteriologically: (1) The gonococcus can be deposited in the genital tract and not develop, the patient escaping the disease entirely. (2) It may rest in the genital tract

and still retain its virulency and capability of transmitting the disease. (3) The gonococcus may remain in the female urethra, at least for several days, without giving rise to any appreciable clinical signs. (4) Menstruation may light up a gonorrhea which would otherwise remain latent. The author ends by answering the question with which he heads his article by quoting Ricord to the effect that "the most beautiful girl in the world can only give that which she has."—*University Medical Magazine.*

SOME FACTS RELATIVE TO ACCIDENTS FROM THYROIDECTOMY.

In relation to the facts published by M. E. Gley in reference to ultimate sequelae from thyroidectomy, MM. Cadéac and Guinard report that in this operation, which they have practiced upon four dogs, the usual results were recognized in this species. One dog survived until the twenty-ninth day. A complete operation has also terminated fatally in rabbits. In six sheep, one of which was a ewe with lambs, in neither the mother nor the young, nor in three aged horses and a yearling colt did any unfavorable results follow the operation. The autopsy of these animals was made with the greatest care ; it revealed no lesion and showed that the ablation of the thyroids had been complete, and that no accessory glands existed. M. Blanc has also observed in an aged horse in a healthy state atrophy with total degeneration of the thyroid bodies. These facts show the great difference of the physiological rôle played by these organs in the different species. The removal of these bodies according to these observers has variable effects, according to the species. Their experiments have shown, contrary to what is observed in the dog, that the double and total ablation of the thyroid bodies does not seem to have any influence upon the temperature either in the horse or in the sheep. The presence of albumen, sugar, biliary matters, etc., complicating this procedure in the canine species, has not been observed in the horse. The augmentation of the toxic properties of the urinary secretion of dogs deprived of their thyroid bodies is a well-known fact which is observed very distinctly in the conditions reported by Gley, Laulaine and Masoin ; but the conditions are quite different in the horse.—*Revue Vétérinaire.*

PSEUDO-TUBERCULOSIS PRODUCED BY THE DISTOMA HEPATICUM IN THE LIVER AND THE LUNGS OF THE OX.

Pilavios (Athens) mentions that this condition in the bovida is not very rare, and the most important observations upon this point have been made by M. Morot, who, however, believes that the instances of pseudo-tuberculosis of the liver and the lungs in the same animal due to the distoma are much less frequent. He mentions the following observation:

In making the autopsy of a steer killed at the abattoir of Athens he has had occasion to observe on the surface, as well as in the interior of the liver and the lungs, small tubercle-like tumors whose width varied from that of a pea to that of a hazel-nut. The macroscopical lesions were such that the case was at first mistaken for true tuberculosis, but the most minute and careful bacteriological examination of the nodes which invaded the tissues did not show the least evidence of any trace of the bacillus of Koch. On the contrary, considerable numbers of the eggs of the distoma hepaticum have been found invading the biliary canals and the parenchyma of the liver. The most striking lesion in the autopsy was the existence of tubercle-like lesions in a mesenteric ganglion. This ganglion was hypertrophied, having the volume of a small walnut, and, besides, was cheesy. A microscopic examination of the caseous mass in the gland gave negative results. There is one obscure point which has given rise to scientific discussions among physicians and veterinarians; some have pretended that tuberculosis may exist, although they have not been successful in determining the presence of, or inoculating the bacillus of Koch. The author believes that the lesion was due to the distoma hepaticum in view of the purulent centres which the trematodes have developed in the liver. He believes that the subject still requires careful investigation.—*Recueil de Médecine Vétérinaire*.

PROCEEDINGS OF SOCIETIES.

MARYLAND STATE VETERINARY MEDICAL ASSOCIATION.

The regular quarterly meeting of the association was held at the Hotel Rennert, on Tuesday, July 24, at 2 p. m. In the absence of the president the meeting was called to order by the secretary.

Dr. William N. Dougherty was elected chairman *pro tempore*. Drs. Dougherty, Lloyd and Clement responded to the roll call. Dr. Robert Ward was present as a visitor.

The secretary read a letter from Dr. Stewart E. Paulet, tendering his resignation on account of it being impossible for him to abide by the code of ethics. It was voted to accept Dr. Paulet's resignation.

The secretary also read a letter from the secretary of the Virginia State Association to this association extending an invitation to the meeting at Norfolk in August.

It was voted to thank the secretary of the Virginia Association for his kindness, but that it would be impossible for us to send delegates to the meeting.

Dr. Clement read a paper on "The History and Purposes of the Association," which was well received by those present.

The meeting then adjourned.

A. W. Clement,
Secretary.

PHILADELPHIA SOCIETY VETERINARY MEDICINE.

The regular monthly meeting of the Philadelphia Society of Veterinary Medicine was held on Wednesday evening, August 8, at 3608 Pine street. The following members were present: President, Dr. Conrow, Drs. Harger, Conard, Pearson, Adams, Rodgers, Bartholomew, Senseman, Marshall, Tag.

The minutes of the previous meeting were read and adopted. The application of Dr. J. C. Marshall having been reported favorable, the secretary was requested to cast the ballot, and Dr. Marshall was declared a member. Dr. Conard read an interesting paper on Laminitis followed by Endocarditis which elicited considerable discussion and brought out some important points on the various complications and treatment of this disease, among which a case of acute laminitis was reported by Dr. Harger, in which the animal died within three days. Dr. Harger further suggested the use of salol as an efficient remedy for this disease. Dr. Rodgers inclined to the opinion that the majority of cases were due to a rheumatic diathesis, and promised to furnish a paper on the subject for the next meeting.

Dr. Pearson moved that a committee of three be appointed to consult with the State Veterinary Medical Association for the purpose of entertaining the visiting members at the coming meeting of the United States Veterinary Medical Association. The motion was seconded by Dr. Harger and carried.

Dr. Harger moved that the matter of expense be left to the discretion of the committee in their conference with the committees of other veterinary societies appointed for a similar purpose; this motion was also carried, whereupon the president appointed Drs. Pearson, Harger and Adams, as the committee of three.

Dr. Pearson further moved that Dr. Harger be appointed a committee of one to arrange for a special meeting of this society in October. Carried.

There being no other business on hand the society adjourned to meet again at the same place on Wednesday evening, September 12.

WILLIAM TAG,
Secretary.

NEW JERSEY VETERINARY MEDICAL ASSOCIATION.

The Thirty-second regular meeting of the Veterinary Medical Association of New Jersey, was held at Sanger Hall, Newark, August 9, 1894.

Meeting called to order by the president at 11.45 a. m. Roll call. But thirteen members present, and one delegate from the Pennsylvania State Association, Dr. Jas. B. Raynor. The president's address was on subjects of much interest to the Association. The secretary's and treasurer's report showed the Association in a flourishing condition.

Dr. Lockwood reported the names of Dr. Loblin of New Brunswick, and Dr. Pocock of Plainfield, as candidates for membership. Dr. Miller for the Legislative Committee reported their failure to secure the passage by the last legislature of the bill pertaining to the eradication of tuberculosis. Dr. Gerth, Jr., requested the secretary to read a patent medicine circular of Dr. Cooper's, of Trenton, which gave the names of twelve of the members of this Association as references.

Dr. Hawk moved that the president and Drs. Dustan and Higgins be a committee to draft resolutions and print same, denying that any of the members had given their consent that Dr. Cooper use their names, and denouncing Dr. Cooper for doing so.

Dr. Miller moved to revise the constitution and by-laws of the Association, also to hold but two meetings a year instead of three, as at present. Seconded and carried.

The president appointed Drs. Hawk, Gerth and Lockwood a committee on revision. The same committee was appointed to draft suitable resolutions on the death of our late honorary member, Dr. E. M. Hunt, Secretary State Board of Health.

Dr. Miller requested the members to use their influence to stop the indiscriminate docking of horses' tails, also to try and get a law passed to punish owners for driving docked horses during the summer months without nets or some other protection from flies.

Dr. Raynor then spoke of cruelty to animals, and gave some very amusing incidents in his experience with ignorant agents of the Society for the Prevention of Cruelty to Animals.

The meeting adjourned at 1.15 for dinner. Meeting reconvened at 3 p. m. As the day was very warm the essays for the day were held over to next meeting.

The secretary read several letters of invitation from other associations.

The president asked the members to examine the register in their respective counties and get a list of all legally qualified veterinarians in the State for the purpose of printing the same.

The remainder of the afternoon was devoted to reporting cases and their treatment, and all declared it to be one of the pleasantest meetings ever held.

Adjourned to meet in Trenton the second Thursday in December.

S. Lockwood, *Secretary.*

THIRTY-FIRST ANNUAL MEETING OF THE UNITED STATES VETERINARY MEDICAL ASSOCIATION.

[Organized June 1863.]

Academy of Natural Science, Nineteenth and Race streets, Philadelphia, Pa., September 18, 19 and 20, 1894.

Officers: W. Horace Hoskins, President, 3452-54 Ludlow street, Philadelphia, Pa.; A. W. Clement, Vice-President, 910 Cathedral street, Baltimore, Md.; T. J. Turner, Secretary, Columbia, Mo.; James L. Robertson, Treasurer, 409 Ninth avenue, New York City.

Committee of Arrangements: Drs. Leonard Pearson, Chairman, 2200 Pine street, Philadelphia, Pa.; William Zuill, 857 North Broad street, Philadelphia, Pa.; W. B. E. Miller, 527 Penn street, Camden, N. J.; James B. Rayner, West Chester, Pa., and H. J. McClellan, Lansdowne, Pa.

All railroads in the Trunk Line Association and Central Traffic Association will grant the usual 1⅓ rates to all members and delegates in attendance. All persons attending this meeting will procure certificates from agent at point of starting, paying full fare going, and present their certificates for signature of the Secretary at the meeting, which will entitle them to a ⅓ rate returning. Tickets will be issued three days in advance of the meeting and will be good for three days after the meeting.

The Committee of Arrangements recommends the following hotels as convenient and well adapted for entertaining all who may attend: Hotel Hanover, Twelfth and Arch streets, $2.50 per day and upward; Bingham House, Eleventh and Market streets, $2.50 per day and upward; Hotel Lafayette, Broad and Chestnut streets, $3.00 per day and upward; Colonnade

Hotel, corner Fifteenth and Chestnut streets, European plan, $2.00 per day and upward; American plan, $3.co per day and upward.

Hotel Hanover will be the headquarters of the members.

September 17, 1894.—Special meeting of the Association of Veterinary Faculties of Colleges of North America, Hotel Hanover, 3 p. m.

Special meeting of Comitia Minora, Hotel Hanover, 8 p. m.

PROGRAM.

September 18, 1894.

9 a. m. Regular Meeting of the Comitia Minora.
10 a. m. Annual meeting convened.

ROLL CALL.

Address of welcome to the members by Mayor Edwin S. Stuart.
President's address.
Unfinished business.
Reception and consideration of Report of Comitia Minora.
1 p. m. Adjournment for lunch.
2 p. m. Reconvened.

REPORTS OF COMMITTEES.

1. Committee on Intelligence and Education.
2. Finance Committee.
3. Committee on Diseases.
4. Prize Committee.
5. Committee on Army Legislation.
6. Publication Committee.
7. Secretary's Report.
8. Reports from Assistant State and Foreign Secretaries.

September 19, 1894.

9 a. m. Meeting of Comitia Minora.
10 a. m. Roll call.
Report of Comitia Minora.

REPORTS OF SPECIAL COMMITTEES.

1. Committee on Congress of Colleges.
2. Committee on Act of Incorporation.

3. Committee on Revision of Constitution and By-laws.
4. Committee on Nomenclature of Swine Disease and Hog Cholera.

Discussion of Reports of Committees.
Election of officers.
New business.
1 p. m. Adjournment for lunch.
2 p. m. Reconvened.

READING OF PAPERS.

"Neurotomy as a Practical Operation," by Dr. S. J. J. Harger, Philadelphia, Pa.
"Psychology of Domestic Animals," by Dr. Olaf Schwarzkopf, Chicago, Ill.
Unfinished discussion of paper on "New Method of Treating Periodic Ophthalmia by Surgical Interference."

September 20, 1894.

9 a. m. Meeting of Comitia Minora.
10 a. m. Roll call.
Report of Comitia Minora.

READING OF PAPERS.

"Tuberculosis," Dr. J. Faust, Poughkeepsie, N. Y.; Dr. M. R. Trumbower, Sterling, Ill.; Dr. Leonard Pearson, Philadelphia, Pa.
Discussion of Tuberculosis.
1 p. m. Adjournment for lunch.
2 p. m. Reconvened.

READING OF PAPERS.

"The Peculiarities of the Diseases of the Rocky Mountain Regions," Dr. W. L. Williams, Bozeman, Montana.
"Horse-shoeing," Dr. L. McLean, Brooklyn, N. Y.
Discussion of papers.
6 p. m. Adjournment.
7 p. m. Banquet.

APPLICATIONS FOR MEMBERSHIP—1894.

Honorary Membership.

Professor Wesley Mills, M. A., M. D., V. S., Montreal, Canada. Proposed by Drs. A. W. Clement and W. Horace

Hoskins. Offered on the grounds of his valuable contributions to Comparative Science and his special work in contributing to Comparative Science his valuable work on Physiology, Canine Pathology, etc.

Active Membership.

C. H. Doepel, D. V. S., A. V. C., Mamaroneck, West Chester County, N. Y. Vouchers, E. B. Ackerman, W. H. Coates.

H. F. Doris, D. V. S., A. V. C., Thirty-seventh street, Pittsburg, Pa. Vouchers, W. Horace Hoskins, Jas. A. Waugh.

John D. Duchene, D. V. S., Veterinary Department Laval University, Quebec, Canada. Voucher, M. A. Piche.

Matthew H. McKillup, M. D., V. S., Chicago and Ontario V. C., 1639 Wabash avenue, Chicago, Ill. Vouchers, J. M. Wright, J. S. Butler.

Louis A. Marillat, V. S., Ontario V. C., 1639 Wabash avenue, Chicago, Ill. Voucher, J. M. Wright.

David P. Fox, D. V. S., Chicago V. C., Sacramento, Cal. Voucher, R. A. Archibald.

Thomas Maclay, M. R. C. V. S., Glasgow, Scotland, Petulama, California. Voucher, R. A. Archibald.

H. F. Spencer, D. V. S., Chicago V. C., San Jose, California, Voucher, R. A. Archibald.

RAILROAD RATES TO THE UNITED STATES VETERINARY MEDICAL ASSOCIATION'S MEETING IN PHILADELPHIA.

COLUMBIA, MO., August 18, 1894.

EDITOR OF VETERINARY MAGAZINE.

Dear Sir:—It gives me pleasure to inform you of the following, and to request its insertion in the August number of your journal:

TO THE UNITED STATES MEDICAL ASSOCIATION.

Rates of one and one-third fare have been granted over the following railroads in the trunk Line passenger territory, to wit:

Addison and Pennsylvania.
Allegheny Valley.
Baltimore and Ohio (Parkesburg, Bellaire and Wheeling, and east thereof).
Baltimore and Potomac.
*Bennington and Rutland.
Camden and Atlantic.
Central of New York.
Central of Vermont.

Chautauqua Lake (for business to points in Trunk Line territory).
Chesapeake and Ohio.
Cumberland Valley.
Delaware, Hudson Canal Company.
Delaware, Lackawanna and Western.
Elmira, Cortland and Northern.
Fall Brook Coal Company.
*Fitchburg,
Fonda, Johnstown and Gloversville.
*Grand Trunk.
Lehigh Valley.
New York Central and Hudson River (Harlem Division excepted).
New York, Philadelphia and Norfolk.
New York, Susquehanna and Western.
Northern Central.
Pennsylvania.
Philadelphia and Erie.
Philadelphia and Reading.
Philadelphia, Wilmington and Baltimore.
Rome, Watertown and Ogdensburg.
Western New York and Pennsylvania.
West Jersey.
West Shore.
Wilmington and Northern.
To annual meeting in Philadelphia September 18, 19, 20, 1894.

Members when buying tickets should apply some thirty minutes before train time and secure a certificate from agent from whom the ticket is purchased.

Respectfully,

T. J. TURNER, *Secretary.*

Columbia, Boone County, Mo.

* Only for business originating at or destined to stations on the direct line of these roads between Troy, N. Y., and Montreal, Canada.

OBITUARY NOTICE.

The sudden and unexpected death of Dr. Charles B. Michener at the American House, Washington, D. C., August 9, 1894, from cerebral apoplexy, removes a well known and prominent member of the veterinary profession of America.

Born about 1856, at Carversville, Pa., the son of Isaiah Michener, the oldest living member of the profession in Pennsylvania, he became the second member of that family to adopt the veterinary profession.

After years of apprenticeship with his father, he graduated at the American Veterinary College, March 20, 1876, and returned to Pennsylvania to practice, subsequently serving as Veterinarian to the State Board of Agriculture.

At different periods he was associated with the Bureau of Animal Industry in the work of stamping out contagious pleuro-pneumonia.

In October, 1880, he was called to his *alma mater* to fill the chairs of Materia Medica and Therapeutics and that of Veterinary Obstetrics, continuing his work there until 1888 when he severed his connection with the school to connect himself with the New York Veterinary College, filling the chairs of Cattle Pathology and Obstetrics until 1890, when he received at the hands of President Harrison's administration the appointment of Assistant Chief of the Bureau of Animal Industry, a new position created at the time of his acceptance. He remained there until shortly after President Cleveland's administration, when his resignation was accepted and the position was done away with.

During the latter year of his official career at Washington, he with others conceived the idea of establishing at Washington another veterinary college. This was established in 1892 under the name of the National Veterinary College, and his associates were many of those occupying leading positions in the Bureau. The school met with the most adverse criticism from the profession, owing to its short curriculum, and this,

followed by internal dissensions in the Board of Management, culminated in his severance of his connection therewith. At the time of his death he was completing plans for the opening of another school at Washington under the name of the Washington Veterinary College.

From 1880 to 1889 he held the position of Secretary of the United States Veterinary Medical Association, and in 1889 at Brooklyn was elected to the office of president for one term.

He has always been favored with a lucrative practice in the various locations he has occupied.

He was genial, made many friends in every position he filled, and his death will be regretted by a wide circle of acquaintances.

He was a member of the Masonic fraternity and his funeral was conducted with Masonic rites. In pursuance with his oft-expressed wish his body was cremated.

THE
VETERINARY MAGAZINE.

VOL. I. SEPTEMBER, 1894. No. 9.

TUBERCULOSIS.

BY PROFESSOR E. D. NILES, D. V. M.,
Blacksburg, Va.

[A Paper read before the Virginia State Veterinary Medical Association at its Meeting in Norfolk, Va., August 15, 1894.]

So much has been said and written on this subject that I fear any attempt on my part to give you anything new will result in an abortive effort. It seems to me, therefore, that the president of this association has made one of the greatest mistakes of his life in appointing me as an essayist on this particular subject. That the subject is, however, an important one, all will admit, for there is probably no warm-blooded animal that shows perfect immunity against this terrible disease.

That it is readily transmitted from one animal to another, and from the lower animals to man, hence a highly infectious disease, no one can authoritatively deny.

That it furnishes both the medical and veterinary professions with a serious problem to solve is an accepted fact.

That it affords the State legislatures an opportunity to do *something* for the benefit of their constituents is a fact yet to be impressed upon the minds of those honorable bodies, for without the proper legislation the veterinary and medical profession can do practically nothing toward stamping out the disease. We can advise, and continue to advise, until Gabriel blows his trumpet; but it does no good with the majority of the masses unless we have the power to put our advice into practice.

That the aid of the State authorities is needed to check the ravages of this disease I shall attempt to show later on in my paper.

No doubt you are all familiar with the history of tuberculosis, but to bring the subject more vividly before you in all of its phases I shall worry you for a few moments with the views of our ancestors, and in so doing endeavor to demonstrate to you that those who are now advocating the infectiousness of the disease and calling for public aid are not doing so without a firm foundation upon which to base their arguments. Tuberculosis has been known, although imperfectly understood, since the days of Moses; for in the laws of Moses we find that the flesh of tuberculous animals was discarded as unwholesome. In the ninth century European people made laws which forbade the use of tuberculous meat. These laws were continued, or made more rigid, as late as 1858. In 1702 the disease was coupled with syphilis, and hence, named the French disease. About this time, or soon after, Germany made stringent laws compelling the slaughter of all tuberculous animals. But in 1783 it was shown that the diseases had no connection with each other, and the strict regulations were at once relaxed. From the above it would appear that the former regulations were made solely through the fear that tuberculosis was of a syphilitic nature, and that when this was disproved all fear of the disease was banished. We can not, however, help but believe that among the more learned class of people this was not the case, but among the public in general this secondary idea had become so firmly impressed upon their minds that the rigid laws could no longer be enforced. Up to the year 1783 the contagious theory of tuberculosis had many advocates, yet the balance of opinion was on the opposite side. Even those who affirmed the contagiousness of the disease were in the dark as to its true cause. Some fault in the animal's hygiene was, as a rule, the attributed cause, the nature of which was not known. The first intimation that some irritating or infectious element was contained in the milk of cows suffering with the disease is due to Gerlach, late director of the Royal Veterinary Institute of Berlin.

Villemin, Klebs, Orth, Buhl and others demonstrated, during the period from 1857 to 1864, beyond a doubt, that the elements from tubercular diseased organs contained some peculiar infectious material, which when inoculated into other animals experimentally was capable of producing the same disease. As a result of these experiments Villemin announced in 1864

that tuberculosis was a specific disease, and due entirely to some specific cause from without the animal organism. The true cause of the disease, however, remained shrouded in darkness until Koch, in 1882, announced his discovery of the bacillus of tuberculosis. Since that time all of the experiments have served to strengthen Koch's statement that the *bacillus* is the sole cause of tuberculosis.

The manner in which the disease spreads from one animal to another and from the lower animals to the human family, and *vice versa*, is an interesting one, and demands our serious consideration.

As all, or most, warm-blooded animals are subject to the disease, the germ must necessarily have a large number of carriers. Before entering into a discussion of the manner in which the disease is spread, it may be stated that the germ may enter the system of the healthy subject through the respiratory, digestive and sexual organs and skin. It may also enter the unborn fœtus through the dam. It most frequently, however, enters the system through the digestive and respiratory organs. When the infection is through the respiratory organs the subject must be brought in close contact or housed with others suffering from the disease. Not so with those that are infected through the digestive tract. For the germ may be carried for miles by other smaller animals. Since rats may be infected they may become carriers of the bacillus; feeding in the feed troughs and mangers as they do, one tuberculous rat may easily infect a whole herd of cattle by contaminating the food of these animals. Cats which have slept in the mangers of tuberculous animals have been known to contract the disease. They, too, may be common carriers of the bacillus, distributing them alike among the human family and the lower animals. It is also reasonable to suppose that the cat may contract the disease from the human subject, and from them communicate it to the lower animals. It was formerly supposed that dogs showed perfect immunity against the disease, but recent experiments have demonstrated that they are by no means uncommon subjects. They, therefore, may distribute the disease far and wide. The earth worm is also said to distribute the disease by bringing to the surface the germ from tuberculous animals which have been buried. Buzzards, though possibly not susceptible to the disease, may also

distribute the germ in every direction from the carcasses of tuberculous animals which have been allowed to lie on the surface of the soil. Diseased cattle may infect the pastures, barn-yards, springs, etc. These are all possible sources of contaminating the food and water consumed by the healthy individual, thereby indirectly infecting animals which, in some instances, may be miles away from the primary source of infection.

Infection through the skin is rare, and usually takes place through an abraded surface.

Infection through the generative organs is also comparatively rare, and is the result of allowing healthy animals to be bred to those suffering from genital tuberculosis.

Infection of the unborn fœtus through the dam may occur, but in such instances abortion is the rule; the fœtus rarely ever being born alive with tuberculosis. An abortion in a human subject, whose sputum contained a large number of the bacilli of tuberculosis, was recently reported to the writer by a local physician.

That animals may contract the disease from tuberculous attendants is also a question worthy of consideration. The prevalence of tuberculosis in the lower animals is alarming, and if the statistics were carefully collected it would be seen that the disease is much more prevalent in the human family than is generally supposed by the public. In the human family the average ratio of deaths from tuberculosis to the total mortality is fourteen per cent, while in some localities it runs as high as thirty-three to fifty per cent. Professor Law, of the Cornell University says: "If the 5490 deaths from tuberculosis which occur every year in the city of New York could be brought together in an epidemic lasting but one week, no small pox, cholera nor yellow fever scare would approach the panic which would thus be created." Again: "If we take the whole civilized world and compare with the tuberculosis mortality, all the accumulated deaths from the war, famine, plague, cholera, yellow fever and small pox we find that the latter are comparatively insignificant." Yet comparatively nothing is done to stamp out or check the ravages of this terrible disease. If in the lower animals, cattle especially, the disease was one that produced death in a short time the mortality in one year would be greater than that of all other diseases combined.

Accurate statistics are wanting to give the accurate percentage of tuberculous animals in our herds, due to a lack of systematic professional inspection of all live animals, and those slaughtered for food. That the disease is more prevalent among the bovine than any of the other lower animals is probably due to the fact of their being more closely housed, more highly fed for dairy purposes and receiving less exercise. All domestic animals, however, take the disease readily enough when inoculated with it. In dairy cows and breeding cattle the disease is much more prevalent than in other cattle, due to the fact that their vitality is lowered by high feeding, lack of proper exercise, and being over-crowded in poorly ventilated stables. It is said that in some such herds the per cent of tuberculous cattle runs as high as ninety-eight while in others no trace of the disease exists. These latter have been fortunate enough not to have had a tuberculous subject introduced in their midst. The following figures will give some idea of the ratio of infection in the different sexes. Although the statistics are probably somewhat inaccurate it will be seen that cows head the list, oxen second, bulls third, and yearlings and calves fourth. The fact that steers are usually allowed to run at large, which lessens the frequency of exposure, and that they are usually marketed at from two to four years of age explains why they are less frequently affected than cows. Bulls, too, are usually kept by themselves and are, therefore, not so frequently exposed. The disease being more prevalent in older animals accounts for the low percentage in yearlings and calves. Germany furnishes us with the following statistics from a number of its abattoirs as follows: cows 6.9 per cent, oxen 3.6 per cent, bulls 2.6 per cent, calves and yearlings 1 per cent. In Leipsic, tuberculous cows were 26 per cent, oxen 19.5 per cent, bulls 15.4 per cent and calves 9.3 per cent. Amsterdam shows a steady increase of the disease for the last six years as follows: in 1888 out of a total number of 28,016 animals slaughtered 495 or 1.76 per cent were tuberculous. In 1889 out of a total number of 26,225 animals slaughtered 793 or 3.5 per cent were tuberculous. In 1890 out of a total number of 22,813 animals slaughtered 755 or 3.3 per cent were tuberculous. In 1891 out of a total number of 23,392 animals slaughtered 1,248 or 5.3 per cent were tuberculous. In 1892 out of a total number of 25,454 animals slaughtered 1332 or

5.3 per cent were tuberculous. In 1893 out of a total number of 28,342 animals slaughtered 1,491 or 5.26 per cent were tuberculous.

If accurate statistics could be obtained in this country no doubt they would be equally, if not more, alarming than the above.

The prevalence of tuberculosis in the human family has been mentioned above, and the question may be asked: Why is the mortality so great in the human family? For an answer one only needs to consider for a moment that as a rule there are no sanitary precautions taken by families who have tuberculosis in their midst; and unfortunately by many of their family physicians. Not long since, the writer was informed of a family of mountaineers who lived in a little log hut. A member of this family had tuberculosis, and expectorated on the walls, floor, and in fact wherever it was most convenient. The result is that there are two or three more patients in the same family.

If there was any doubt about the disease being contagious this one instance is ample proof of the affirmative. There is no doubt that a large per cent of the cases of tuberculosis in man are due to the use of the flesh and milk of tuberculous animals. It may be safely stated that no less than fifty per cent of the cases are developed from this source, which can only be avoided by means which I will suggest later.

The danger of using tuberculous meat and milk is two fold; viz., that of contracting the disease, and that of aggravating the disease in those who are already affected.

It is a well known fact that the milk of tuberculous cows is much more dangerous than the meat; since the milk is usually consumed in the raw state. Rare meat, however, may contain the live germ, and even though the meat may be cooked done, the temperature may not have reached a point sufficiently high to destroy the germ in all parts of the meat. It was formerly supposed that salted meats were perfectly safe for consumption, but later experiments have shown that the germ may survive as long as thirty days. As the salt does not penetrate all parts of the meat alike, some of the germs may survive even longer. Our European friends recommend sending tuberculous cattle to the butcher if not poor in flesh. This practice can not be too strongly condemned, for although the lesions may be local the

germ may be in all parts of the body ; since it is circulated by the blood and lymph. It may be stated in this connection that the germ is necessarily circulated in the system for some time before general tuberculosis takes place. The mere fact then that the visible lesions are local is no indication that the flesh and milk of such animals are free from the germ. That the milk of tuberculous animals is exceedingly dangerous is demonstrated by the fact that a large majority of all the deaths of bottle-fed infants in the large cities are due to some form of tuberculosis.

All germs that cause disease do so by the poisonous products of their growth and multiplication within the system. In tuberculosis then, it is this chemical poison that causes the lesions, and, the more rapidly this poison is formed the more marked will be the symptoms, and the sooner will the disease prove fatal. The system, as well as the milk, of tuberculous animals contains to a degree corresponding to the extent of the disease a quantity of these toxalbumins, which when consumed with the flesh and milk by tuberculous people adds just so much more poison to the patient's system, thus converting what may be, in many instances, local tuberculosis into a general form of the disease and possibly cutting short the life of the individual a number of years. This theory is self-evident when we stop to consider the manner in which Koch's lymph, or tuberculin, exerts its influence on tuberculous subjects when injected into the system.

The symptoms of tuberculosis are too well known to call for any discussion in this paper.

The treatment is of but little importance to us as veterinarians, as the only proper course to pursue is to destroy all animals as soon as found to be tuberculous. With the medical profession the matter must be viewed from a different standpoint, for in their patients treatment must be attempted.

Many remedies, both new and old, have been tried but all have failed.

Dr. Yeo, of the King College, London, and others, have great faith in the use of creosote by inhalation, and large doses by the rectum, claiming to have gotten good results when the treatment was applied in the early stages of the disease.

Drs. Bertin and Picq claim to have effected a cure in a limited number of cases, by injecting goats milk when all classical

treatment had failed. Professor Liebreich, of Germany, claims to have successfully treated a few cases by the hypodermic use of cantharadate of potash.

Aristol in olive oil has been used hypodermically; its advocates claiming a certain degree of success. The so-called "Amic treatment," which at present is a secret, originated in Cincinnati, but from reports of local physicians has no curative effect. The *Modern Medicine and Bacteriological World* quotes an article from the *Pacific Record*, in 1892, announcing a new chemical substance which Klebs prepares from Koch's tuberculin, and which he names tuberculocidin. It is nothing more nor less than tuberculin with its injurious elements eliminated; and, at the same time, retaining its curative properties. It causes no elevation of temperature when injected into the system. In fact it is claimed that large doses reduce the temperature. Out of a number of human subjects treated, Klebs claims to have cured, 18.6 per cent; improved, 60 per cent; no improvement, 18.6 per cent; deaths, 2.6 per cent. This is really a very good record, but as no further announcements have been made we may reasonably suppose that further experiments with this substance have not proved satisfactory.

When Koch announced his discovery of tuberculin in 1890, we were for a time led to believe that a cure for tuberculosis was at last at hand. Disappointment, however, was the result. In experiments conducted with this substance a marked elevation of temperature was noticed when it was injected into the system of tuberculous subjects. In healthy subjects no elevation of temperature was noticed. In view of this fact tuberculin has been extensively used since 1891 as a diagnostic agent in the lower animals. For this purpose its value can not be over-estimated. The manner in which it acts as a diagnostic agent is an interesting one, and demands a few moments of our time.

I have stated before that the system of tuberculous patients is charged with the toxalbumins of the germ of the disease. This product of the germ is nothing more nor less than tuberculin. The addition of a small amount of artificially prepared tuberculin to that already contained in the system causes a temporary fever, or reaction, in from six to twelve hours after the injection. The reaction varies from one to six degrees above the average normal temperature, and lasts from twelve

to fourteen hours. In healthy subjects the quantity of tuberculin injected is so small that the animal is not affected by it. Reports are unanimous in support of this statement.

That this new method of detecting the disease in all of its stages is an extremely delicate and accurate one will be seen by the following experiments.

In April, 1893, tuberculin was used on the entire herd of cattle at the experiment station, with the result that only one animal gave the reaction. This animal was a thoroughbred shorthorn cow in excellent flesh for beef, for which she would have been sold in another week, as she was worthless as a dairy cow. The elevation of temperature above the normal was 1.8 degrees. A post-mortem examination revealed intestinal tuberculosis, with two large tubercles on the liver. In July, of the same year, by the request of Captain C. E. Vawter, of the Miller School, and with the assistance of Professor Tinsley, I used tuberculin on the entire herd of milch cows belonging to the above-mentioned school, with the result that one cow gave a reaction of 4.2 degrees. An autopsy in this case revealed intestinal and pulmonary tuberculosis. This cow was a high-grade Jersey, and was in good milking condition, showing no outward signs of the disease.

After the test was made on the college cattle a "scrub" milch cow was purchased and allowed to run with the other cattle on the farm. During the latter part of winter this cow suddenly died of acute tubercular pleuritis and pericarditis. To ascertain the result of bringing this diseased animal to a healthy herd, the tuberculin test was repeated on the entire herd of seventy-two head of cattle last June, with the result that six animals gave the reaction as follows:

Thoroughbred Holstein cow, three years old, reaction 2 degrees.

Native cow, three years old, reaction 1.1 degrees.

Thoroughbred Jersey cow, five years old, reaction 1.2 degrees.

Thoroughbred Holstein bull, three years old, reaction 2.4 degrees.

Thoroughbred Guernsey heifer, two years old, reaction 1 degree.

Thoroughbred Jersey bull calf, reaction 1.1 degrees.

At this time the general condition of all of these cattle was good with the exception of the Holstein cow and bull. The

bull had frequent attacks of diarrhœa and would not fatten with the best of care. The cow had recently calved, and had not done well since.

As the reactions in all of these animals (except the bull, which had an abnormally low temperature before injection), were slight, and all but one were thoroughbreds, it was thought best to separate them from the herd and make a second test. It may be stated in this connection that the temperatures of these animals, both before and after injection, were submitted to Dr. Salmon, of the Bureau of Animal Industry, and that he reported none at all suspicious except the Holstein bull. The animals were kept separate, however, and tested the second time a month later, with the result that the Holstein bull was the only one that gave any trace of a reaction; the elevation of temperature in his case being 1.3 degrees. As a result of this test the animals were allowed to mingle with the balance of the herd until June 15, when my attention was called to the Jersey cow which had, since the test, lost flesh rapidly and developed an aggravating cough. Suspecting tuberculosis, she was at once destroyed and an autopsy held which revealed pulmonary and intestinal tuberculosis with enlargement of the lymphatic glands of the mesentery. In fact, this was one of the worst cases of tuberculosis that I have had an opportunity to examine after death.

On June 22, the bull and native cow which showed a reaction of only 1.1 degrees on the first test, and none on the second, were also destroyed. The autopsy on both of these animals revealed intestinal tuberculosis with enlargement of the internal lymphatics. The three remaining animals have not yet been slaughtered, but are isolated, and will be tested with tuberculin later in the fall, and if they show the slightest reaction they will be slaughtered at that time.

The question as to what elevation of temperature constitutes reaction is at the present time an open one. I have seen no cases reported where the animal was condemned with a reaction of one degree, unless the general symptoms were prominent enough to make a diagnosis possible by a physical examination.

Dr. Conrow, in a communication to the VETERINARY MAGAZINE, January, 1894, reports the destruction of one case that showed the physical signs of tuberculosis, and with tuberculin gave a reaction of 1.4 degrees; but upon holding a post-mortem

no tubercles were found. Dr. Conrow does not state whether or not a careful examination of the bones and *all* other tissues of the body was made. If such an examination had been made it is more than probable that tuberculosis in some one of its many hiding places would have been found.

From my own experience I am led to believe that any elevation of temperature, that continues over two or more readings, above the highest normal variation during a period of twelve hours before injection is diagnostic of tuberculosis, and that if we expect to completely eradicate the disease from our herds we must take this as a standard. It would be much more profitable to occasionally destroy a healthy animal than to let one that is diseased escape, even though we expect to repeat the test in six months' time.

The following conclusions may be drawn from the various reports on the use of tuberculin .

1. That tuberculin is of no value as a curative agent; since in both man and beast, whether injected hypodermically or taken into the system with tuberculous milk and meat, it converts latent into acute tuberculosis.

2. That as a diagnostic agent in the lower animals it is exceedingly delicate and almost invariably accurate in the hands of experts.

3. That the method of its use as published by the Bureau of Animal Industry is more accurate than any other method yet in use.

4. That the system acquires a certain tolerance to the action of tuberculin after the first injection; thereby making a second test unreliable without the intervention of several months.

The laws necessary to control the disease in the lower animals and lessen the mortality in man may be briefly stated as follows:

1. The most important of all, the establishment of a State board of health, one member of which shall be a qualified veterinarian.

2. The appointment of a qualified State veterinarian, who shall be an *ex-officio* member of the State board of health, and work under its direction.

3. A liberal appropriation placed at the disposal of these officers in order that they may effectually carry out their work.

4. The establishment of public abattoirs, and compelling the slaughter of all animals for meat at these places.

5. Providing for veterinary inspection of all animals slaughtered for meat. Also veterinary inspection of all public dairies.

6. The provision of some means to compensate owners of all condemned animals.

7. A law empowering the State veterinarian to order the destruction of all condemned animals.

8. The provision of county hospitals for indigent tuberculous people.

9. Compulsory disinfection of all premises that have been occupied by tuberculous people or animals.

10. Compelling the disposal of the carcasses of all tuberculous animals by cremation.

11. Prohibiting tuberculous people from attending public gatherings in closed buildings.

12. Prohibiting the intermarriage of tuberculous people.

With these laws in force tuberculosis can be practically stamped out.

Science is arrayed for the battle; all that is lacking is the declaration of war on the parts of the States and Government.

MATERIA MEDICA.

By Edwin S. Muir, Ph. G., V. M. D.,
Instructor in Veterinary Materia Medica and Pharmacy, University of Pennsylvania.

[The first of a series of articles on Veterinary Materia Medica.]

Materia medica, whether of animal, mineral or vegetable origin, is probably more extensively studied and is better understood than any other branch the professional man has to deal with, nevertheless it is, as regards the pharmacology and therapeutics, not as deeply studied or as well

understood by the veterinary student and practitioner as it should be. With the exception of a few of the principal drugs the pharmacology and therapeutics of medicines for the horse, are almost as a sealed book, and the empirical use of well-known drugs in veterinary medicine is as common now as it was in human practice fifty years ago, a deplorable fact but nevertheless true. Veterinary medicine has made rapid strides in the last quarter century, but the feet of veterinary materia medica have been loaded, as it were, and have lagged away behind the procession. With these facts in view, and with the knowledge that the physiological action of drugs points out their therapeutic value, we will endeavor, by actual experiment on the horse, to bring out some new points in this valuable branch, while we are considering all the well-known characteristics of each drug.

We have decided to adopt that comprehensive and unexcelled system of classification brought out by Professor H. C. Wood, and used in his valuable work on therapeutics, beginning with the nervines: A class or order of drugs which, in the human family at least, have a direct action on some part of the nervous system: Antispasmodics, anæsthetics, somnifacients, delirifacients, excito-motors, depresso-motors, etc. To consider every well-known therapeutic agent would take up too much valuable time and space, so we will restrict ourselves to those which are considered of value to the veterinarian, and which have some decided therapeutic action on the lower animals.

Owing to the fact that the French, decimal or metric system of weights and measures has been adopted by the seventh decennial revision of the pharmacopœia, that it is used in all government and scientific laboratories, taught in the best schools and employed by the most advanced professional men, we have decided to adopt it in specifying doses, distances, amount, etc.

As books of reference we have consulted Professor H. C. Wood's valuable work on "Therapeutics," United States Dispensatory, Dr. Lauder Brunton's "Pharmacology, Therapeutics and Materia Medica," Professor Williams' "Principles and Practice of Medicine and Surgery," and Professor Joseph C. Remington's excellent work on "Practice of Pharmacy." We are indebted to Professor Leonard Pearson for many valuable suggestions and notes.

Asafetida.

Natural order.—Umbellifera.

Habitat.—Persia and Afghanistan.

Source.—Asafetida is a gum-resin obtained from the root of Ferula Narthex and Ferula Scorodosma. The root is fleshy, more or less conical, 0.254 to 0.508 metres in length and .076 to .20 metres in diameter at the top; dark gray and corrugated externally, dirty-white color internally, and contains a fetid, milky juice.

The root yields the largest amount of gum-resin after it has attained the age of four years; giving up from 32. to 1000. gram.

When the leaves begin to fade and fall, about the month of May, the tops are torn or twisted off from the root, and laid over the latter to protect it from the sun's heat. A thin slice is then cut transversely from the top of the root and the juice is allowed to exude. This is scraped off, another slice is cut from the root, and so on, until the root is exhausted and perishes. The gum-resin is then hardened by exposure to the sun. It is exported in mats, cases or casks weighing from 50 200 kilos.

Description.—The gum-resin of asafetida appears in irregular sticky yellowish-grey masses, in which are imbedded creamy-white tears harder than the mass. Asafetida becomes harder on exposure to the air, and the tears break with a somewhat horny fracture. After being exposed they gradually assume a pinkish color, changing later to a brown. Besides a volatile oil, asafetida contains seventy per cent of resin and twenty per cent of gum. With water it forms a milk-white emulsion. The resin is soluble in alcohol, as is the volatile oil. The alcoholic tincture and the emulsion both contain the virtues of the drug, the former to a greater degree. The odor is disagreeable, and somewhat resembles that of garlic. Sulphur is also found in the volatile oil. According to Brunton the gum-resin yields resorcin when treated with potassa. Asafetida is eliminated by the lungs, skin and kidneys. Sp. gr. 1.327.

Therapeutic Action.—Antispasmodic, carminative; gastric stimulant.

Therapeutics.—Asafetida may be used in human practice as an antispasmodic, but its power is too feeble to be depended

upon in veterinary practice (except, perhaps, in the dog), to the exclusion of other well-tried antispasmodics. It may, however, enter into the composition of such mixtures, or be combined with other more pronounced antispasmodics. In the form of an enema it is frequently used for the relief of tympanitis and flatulence; in the latter case it may be combined with oil of turpentine, on account of the stimulating action of the latter.

It is sometimes beneficial as a gently stimulating expectorant in affections of the bronchial mucous membranes. Asafetida has been used as a vermifuge, but its action as an anthelmintic is so feeble and uncertain that we do not advise its use.

Officinal Preparations.

Emulsum Asafetida—(Prepared by triturating 40 grams of the gum-resin in sufficient water to make 1000 cc. of finished product.)

Tinctura Asafetida—(Prepared be exhausting 200 grams of the gum-resin with sufficient alcohol to make 1000 cc. of finished product.)

Doses.—For horses—Gum-resin 8 to 16 grams, tincture 30 to 90 cc.
For cattle—Gum-resin 32 grams, tincture 240 cc.
For dogs—Gum-resin .66 to 1.33 grams, tincture 5 to 10 cc.

It should be given in the form of a bolus, emulsion, or mixed with some bland, mucilaginous drink.

Camphora.

Natural Order.—Laurinæ.

Habitat.—China and Japan.

Source and Preparation.—Officinal camphor is a stearopten obtained from cinnamomum camphora, an evergreen tree resembling the linden, and is found in different parts of eastern Asia. The leaves are alternate, ovate-lanceolate in shape and about three inches in length, having an entire margin, and are smooth, shining, and of a bright yellowish-green color. Camphor is found in all parts of the tree, and is obtained from the root, trunk and branches by sublimation.

There are various methods employed to obtain the officinal drug from the chips; the most common is that employed in Japan. The chips are mixed with water and placed in an iron vessel, which is covered with an earthenware dome filled with rice straw. Heat is applied and the volatilized camphor is

condensed on the straw in small tears, which are removed from the straw and after being put into vats, to allow the oil (oleum camphoræ) to drain off, the crude drug is packed into sacks and exported. This product must be resublimed before it is ready for pharmaceutical and other purposes. The process for refining camphor is as follows: "Crude camphor is mixed with about one-fiftieth of quick-lime and exposed, in an iron vessel, over a sand-bath, to a gradually increasing heat, by which it is first melted, then converted into vapor, which condenses in a suitable receiver." [U. S.]

Description.—Refined camphor occurs in circular cakes about .6 metre in diameter and .03 metre thick, of a tough, fibrous nature, crystalline, white and translucent in appearance, freely soluble in carbon disulphide, chloroform, ether, alcohol and the fixed and volatile oils and in benzine. The odor is penetrating and characteristic, taste is aromatic, bitter and pungent and imparts a cooling sensation to the mouth. It has a somewhat greasy feeling, floats on water and burns with a bright flame, throwing off a heavy black smoke and leaving no residue. It may be easily pulverized by the addition of a small quantity of chloroform, alcohol or any of the liquids which dissolve it. Sp. gr. 0.995.

It is sparingly soluble in water and aqueous solutions. The fracture is shining and granular. It is volatile, and when exposed to the air loses weight rapidly. Melts at 175° C., and boils at 204° C.

When camphor is triturated with chloral, menthol or thymol, a liquid is produced having the characteristics of each drug. Camphor is eliminated by all the secretions of the body, as campho-glycuric acid.

Therapeutic Action.—(Internally)—Antispasmodic, carminative, diaphoretic. Cardiac Stimulant.—Anaphrodisiac (large doses); (externally)—stimulant and rubefacient.

Therapeutics.—As an anaphrodisiac camphor acts, if at all, only in large doses. Its use is indicated in influenza and similar diseases of a typhoid type. It is a useful stimulant to the alimentary tract in diarrhœa, flatulence, spasmodic colic and like conditions. In any irritation of the genito-urinary tract it may be administered combined with belladonna or opium. Given with belladonna in the form of an electuary, in the second stage of laryngitis or bronchitis it is of great benefit. As

a stimulant and carminative it is useful in non-inflammatory diarrhœa of young animals, in which case it relieves pain and spasm and checks the secretion.[1]

OFFICINAL PREPARATIONS.

Aqua Camphoræ—Prepared by triturating camphor 8 grams, alcohol 5 cc., precipitated phosphate of calcium 5 grams together and adding sufficient water to make 1000 cc. Filter.

Linimentum Camphoræ—Dissolve camphor 200 grams in sufficient cottonseed oil to make 1000 grams, using water-bath heat to facilitate the solution.

Linimentum Saponis—A solution prepared from soap 70 grams, camphor 45 grams, oil Rosmary 10 cc., alcohol, 750 cc., water sufficient to make 1000 cc. of liniment.

Spiritus Camphoræ—A ten per cent alcoholic solution of camphor.

Tinctura Opii Camphorata—Powdered opium 4 grams, benzoic acid 4 grams, camphor 4 grams, oil anise 4 cc., glycerine 40 cc., diluted alcohol sufficient to make 1000 cc. Prepared by maceration.

Doses.—For horses—4 to 8 grams.
For cattle—8 to 16 grams.
For dogs—.33 to .66 grams.

May be administered in gruel or in the form of a pill or bolus.

[To be continued.]

NEURECTOMY AS A PRACTICAL OPERATION.

BY DR. S. J. J. HARGER,
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In veterinary surgery, we find a vast field which is still unexplored. We find among the list of major surgical operations many which we perform, as it were, empirically, without inquiring what the actual results in a large number of cases are or what percentage are successful. One of these is neurectomy. The term *neurotomy* is generally misapplied. It simply means a *section* of the nerve, whilst the word *neurectomy*, which is the correct one, means a *resection* of a portion of the nerve trunk, as

[1] Camphor, either alone or combined with some of the other stronger stimulating drugs, makes an excellent local application for bruises, sprains, etc. It enters into the composition of a large number of valuable liniments.

Externally it may be applied either in oily or spirituous solution to allay itching in chronic eczema and urticaria. Dissolved in oil it is used to prevent the attack of flies.—[Dunn.]

it is ordinarily practiced. I have always been an advocate of this operation, but not unjustly so, and have always advocated it without reservation whenever the indications called for it; in fact, so much so as to cause sometimes amusing comment from some of my professional friends whenever I did so. I do not propose to enter into many theoretical details on the subject, but rather to consider it from its more practical aspect.

Great diversity of opinion exists among professional men as to the value and the results that are to be obtained from neurectomy. Some recommend it very indiscriminately, for all varieties of lesions, without first inquiring into the proper indications; this has necessarily militated against its application and brought it into disrepute. If the surgeon misapplies it, if he practices it when it is contra-indicated, not the operation, but the operator should be blamed. Others, very ill-advisedly, discard it almost entirely, and say to the owner "better sell your horse." It is this diversity of opinion which has led me to write this paper.

Various nerve trunks are selected according to the end in view: the *tibial* nerve in stringhalt; the *sciatic* for lesions below the hock, when it is resected about four inches above the point of the hock and opposite to the anterior border of the tendo-achilles; the *median* for lesions between the knee and the fetlock; the *plantar* and the *digital* for diseases below the fetlock. I shall speak only of the last three.

Plantar Neurectomy. Indications.—One should not be too hasty in operating, for I have often seen cases in which navicular disease (?), existing for several weeks to several months, was diagnosed, and recovery followed the use of a foot-bath, a mild liniment, or "turning out" a few weeks. The typical indication is a chronic disease, with pain and lameness, but no mechanical obstruction. Two conditions must here be considered: first, the accuracy of the nerve supply to the diseased area; second, the lameness, the result of pain.

Neurectomy is practiced in ringbone, sidebone, contraction of the hoof, primary and secondary inflammatory conditions of the laminar and the velvety tissues arising from traumatisms, laminitis, lesions secondary to street-nails, keraphocele, quittor operation, etc. Its principal indication is the so-called chronic navicular arthritis. Any acute inflammatory condition is always a contra-indication.

Operation.—The *modus operandi* is well known to all of us, and hence I need not go into the didactic details of the routine surgical stages. I have used cocaine for the last four years, instead of casting the horse. A dram of a four per cent solution in distilled water is injected subcutaneously above the fetlock over the course of the plantar nerve. In only two instances was it necessary to throw the patient. In a double neurectomy one foot is nerved before injecting the other, to avoid the physiological effects of the drug from its absorption which sometimes makes the horse uneasy and complicates the operation. In my experience, I have never seen the sloughing effects of cocaine which some claim to have experienced. In this manner, the foot can be extended, placed upon a box or a stool and held by an assistant and the nerve removed without any laborious efforts. In fact, some horses never move, even while severing the nerve.

The only instruments necessary are a pair of curved scissors, two small dissecting forceps, a bistoury, a thin probe with a sharp, but not cutting extremity, a neurotome and needle and thread or silver wire. I never use a tourniquet or compression of any kind to arrest the hæmorrhage, which is insignificant when the incision is made carefully and in the proper place; on the outside of the foot, the operation is sometimes absolutely bloodless. I do not approve of the use of Dechamp's needle nor of securing the nerve with a thread. This prolongs the operation and may cause the horse to struggle. I simply pass the probe under the nerve-trunk after dissection with the forceps and then make the section. The nerve should be well isolated at the upper angle of the incision, and strong downward traction made before cutting it, in order that it does not protrude into the wound and its extremity is not involved in the cicatrix. I always use a cutaneous suture. In this manner a nerve may be removed in a fraction of a minute. As long a portion of the nerve as possible should be removed.

The only structure that can be mistaken for the nerve and only in the low operation, and even this is not excusable, is the ligamentous cord extending from the plantar cushion to the ergot and obliquely crossing the direction of nerve in the middle of the side of the first phalanx. Drawing the thumbnail over the nerve trunk before section, or the cross-section, as well

as the white color and the striation remove all doubt. The connective tissue should be irritated and torn as little as possible.

Prognosis.—The *prognosis* varies with the disease for which the operation is performed. In an ordinary case of navicular disease it is favorable: in those cases in which there is an intense chronic lameness of long standing, contracted tendons and ligaments, the animal is hollow chested, and the inflammatory changes in the perforans tendon are such that the latter is weakened at its attachment to the os pedis, the prognosis is less favorable. It is *good* in ringbones when there is no anchylosis; also in sidebones in which the low operation suffices in mild cases, but the high is necessary in the aggravated forms. In laminitis the prognosis is good only in very chronic cases, when the inflammatory conditions have disappeared and the deformity of the foot is not too marked. In general, the smaller the diseased area, the less acute and the less advanced the pathological alterations in the tissues, the more favorable is the prognosis. In acute or subacute and in many instances in chronic laminitis I would at any moment expect the separation of the hoof. The prognosis is also more safe for the low operation than for the high. Again, consider the conformation of the foot. In flat-footed, thin-soled, low-heeled feet much predisposed to the effects of concussion and bruises, and in narrow and contracted hoofs an opinion must be more guarded than when the form is normal. Again, the nature of the work done by the animal, the pace and the conditions of the roads have their influence.

Median Neurectomy.—Median neurectomy or section of the median nerve of the brachial plexus, was first practiced by Peters of Berlin in 1885 in the treatment of inflammatory alterations of the tendons in the regions of the canon and chronic lamenesses in the foot.

The modus operandi, which is slightly more complicated than in the plantar operation simply involves the same general principles of surgery and an accurate knowledge of the anatomical relation of the parts. The nerve, situated more or less deep, accompanies the posterior radial artery and vein which must not be injured. The section may be made at several points, as follows:

1. On the inner side of the elbow at the elbow joint where this nerve passes over the internal ligament; at this joint the nerve is covered by the sterno-aponeuroticus muscle.

2. At the upper part of the inside of the forearm before giving off the large branch to the posterior muscles of the forearm.

3. At about the upper fourth of the forearm after giving off the above branch. I prefer the last point of operation, because the posterior radial muscles still retain their nerve supply and yet the parts below the knee that are diseased are deprived of sensation. The incision must be made about one-half of an inch behind the internal border of the radius and about four inches from its upper extremity.

Unfortunately, I have not had much experience with this operation; but reasoning from the anatomical nerve distribution, and this seems to be the general consensus of opinion, it is not to be recommended from our present knowledge for troubles situated below the fetlock, such as ringbone and navicular disease. It does not completely remove the sensibility on the outside half of the foot and hence a variable amount of lameness may remain, because the external plantar is partly composed of fibres from the ulnar.

The principal indications for this operation are lesions of the region of the canon, such as chronic thickening, contraction and inflammation of the perforans, its check ligament, the perforatus, the suspenory ligament and in those irremediable posterior splints involving the preceding structures. In the thickened and contracted tendons of the draft-horse it has been especially successful and rendered the horse entirely useful.

On next page is a table showing the results of several operators.

TABLE.[1]

Disease.	Peters.	Results.	Goldmann.	Results.	Hendricks.	Results.	Baldoni.	Results.	Kull.	Results.	Pellerin.	Results.	Moussu.	Results.
Strain of tendons . .	1	cured	.	. . . .	.	. . . .	.	. . . .	.	. . . .	5	cured 1 double	7	6 cured 1 incomplete
Strain of tendons and lesion of pastern .	1	cured	.	. . . .	.	. . . .	2	1 cured 1 not c'd	.	. . . .	3	incomplete	1	incomplete
								4 improved.						
Sidebone	.	. . . .	1	cured Int. side	.	. . . .	6	1 not impr'v'd 1 cured	.	. . . .	.	. . . .	.	. . . .
								2 cured						
Ringbone	1	cured	1	cured	.	. . . .	3	1 improved	1	cured	.	. . . .	.	. . . .
Novicular disease . .	2	cured	14	13 cur'd 1 lame in 4 mos.	2	1 accid't 1 no kn'wl'ge	1	cured	.	. . . .	.	. . . .	.	. . . .
Chronic lameness from street nail . . .	.	. . . .	1	cured	.	. . . .	.	. . . .	.	. . . .	.	. . . .	.	. . . .

[1] *Rec. de Méd. Vét.*

Some of the above cases have been followed a year and over, and the animal was still able to do his usual work.

Complications and Sequelæ of Plantar and Digital Neurectomy.—Injury to collateral artery of the canon and the digital arteries and veins or the metatarsal veins may result in degeneration of the foot.

1. *Recurrence of the lameness* may take place in from one month to several years. In fact, the horse may not go sound at any time after the operation. (?) Again the lameness may continue for some weeks afterward and then disappear. This I have seen in several cases. The recurrence or continuance may result from one or more of three causes:

(*a*) *Errors in Diagnosis.*—I have no doubt but what some very obscure lamenesses are often mistaken for navicular trouble, even in some of those cases, perhaps, which I have classified in this paper. The animal is nerved, and the operation is condemned.

(*b*) *Recurrent Nerve Supply.*—M. Arloing has demonstrated in the plantar nerves of the horse recurrent fibres which establish peripheral relations between the branches of these nerves and the nerve trunk. Some of the fibres, instead of terminating in peripheral corpuscles or plates in the diseased tissues, make ascending loops and reach the main trunk through the collateral branches. Given a section of the digital nerve the posterior terminating branch of the plantar nerve below the fetlock, the recurrent branches coming from the diseased parts return by way of the collateral branches given off above the point of section, and thus a certain amount of sensation in the parts below is retained. This distribution influences the degree of lameness which remains.

(*c*) *Regeneration of the Nerve.*—The nerve tissue may regenerate itself at the central end and the two extremities thus attain physiological union. The time required for this process varies according to, or at least is modified by, the length of the portion excised. After simple section, it follows in about a month to six weeks; after excision two months to several years, an average, as generally quoted, of one to two years. The distal end becomes atrophied. The nerve regeneration is sometimes very imperfect, which may account for some cutaneous sensibility and the continued integrity of the foot, without manifesting any lameness. On the other hand, the nerve may never regenerate itself, the intervening space being occupied by a band of cicatricial tissue. This is the ideal.

2. *Effect Upon the Gait.*—In navicular disease, if the perforans has not contracted adhesions and the other parts of the foot are normal, digital or low neurectomy has little or no influence upon the gait. If the lesions are chronic, the gait stilty, the animal frequently stumbles and the tendons and ligaments have become rigid and contracted, the movements will not be as free as in the normal foot. Trotting and running races have numerous neurectomized contestants which win races in fast time. Even in saddle horses the operation in many instances has been most successful. The high operation does sometimes interfere with the speed, although the running turf has innumerable instances of such horses that are bread winners. In fact, one would be surprised at the number of race horses that have been nerved.

3. *Growth of the Hoof.*—After section of the nerve the horn is secreted more rapidly. The foot is apt to be high heeled and long toed ; the wall and sole are thicker, sometimes twice the normal thickness. Shoeing should be more frequent. After the low operation the foot often approaches the normal in shape and the heels spread.

4. Accidents from pricking, street-nails may be more frequent, but this is very insignificant. I have seen cases in which the quarter and portion of the sole were separated by suppuration from picking up a nail and had to be removed, but a good recovery followed. Such was a fact in case No. 10 of my operations.

5. *Degeneration of the Structures of the Foot and Separation of the Hoof.*—It was my intention to speak in detail of the physiological phenomena of the degeneration of the foot, but I could not obtain all the necessary data in time, and will reserve this subject for an article to be published in the near future. Brown-Sequard and C. Launear have severed the sciatic nerves of rabbits without any retrograde phenomena in the leg. The first in the tissues is a vaso-motor paralysis, which is only temporary, and disappears in a few days. The pathological changes in the foot, according to my observation, seem to be of an inflammatory nature—a suppurative inflammation. The causes of this condition may be two-fold : The trophic influence of the nerves and traumatisms. The former is the predisposing cause, but at times may be the direct or exciting cause. By traumatisms I do not only mean accidental injuries,

but those which result from the ordinary function of the foot. Injuries to the skin of the nerved foot heal with difficulty. I have seen the foot suppurate in consequence of a blister applied to the coronet. Beyond this I shall not discuss the question here.

Neuroma.—These are true and false. The latter is a neurofibroma, and seldom causes lameness. The treatment is excision.

STATISTICAL CLASSIFICATION OF CASES.

HIGH NEURECTOMY.

Case 1.—Gelding. Navicular disease (sing.) Was operated upon in 1880, and after being under observation for 5 yrs., was sound in 1885.

2.—Mare. Navicular (sing.) Operation, 1890. Observed for 1 yr. Sound.

2.—Same mare. Lame in both feet in 1891. Second operation, 1891. Observed for 6 mos. Sound when last seen.

3.—Gelding. Ringbone on hind leg. Operation, 1887. Observed for 5 yrs. Permanently sound.

4.—Gelding. Ringbone (anterior). Operation, 1890. Observed for 1 yr. Died from tetanus.

5.—Gelding. Ringbone (posterior). Operation, 1890. Observed, 1 yr. Sound when last seen.

6.—Gelding. Navicular (double). Operation, 1882. Observed during 2 mos. Sound when last seen, but was informed that later the "tendons broke down."

7.—Gelding. Navicular (double). Operation, 1883. Observed, 2 mos. Moderately sound (neuromas). Later "broke down."

8.—Gelding. Acute Laminitis. Operation, 1886 (both arteries cut). Results were bad. Foot sloughed off.

9.—Gelding. Ringbone (posterior). Operation, Nov., '88, was unsuccessful.

10.—Gray pony. Navicular (sing.) Operation, Aug., '91. Observed during 3 yrs. Still sound.

11.—Gelding. Navicular (sing.) Operation, Apr., '91. Sound during the following year, at end of which time the foot sloughed off.

12.—Gelding. Navicular (sing.) Operation, June, '92. Observed, 2 yrs. Still sound.

13.—Gelding. Navicular (sing.) Operation, Oct., '92. Did well for 6 mos., when went lame from neuromas, which were subsequently removed. Not doing well at present.

14.—Gelding. Navicular (sing.) Operation, Aug., '92. Observed, 2 yrs. Still sound.

15.—Gelding. Navicular (sing.) Operation, Feb'y., '89. Observed, 5½ yrs. Still working.

Case 16.—Mare. Navicular (very lame). Operation, Feb'y., '89. Lost the foot in 8 mos.

17.—Gelding. Navicular. Operation, Apr., '89. Did well.

18.— " " " " " Did very well.

19.—Mare. " " " " Did well 2 yrs.

20.—Mare. Navicular. Operation May, '89. Observed 5½ yrs. Not lame and is still driven.

21.—Gelding. Navicular. Operation May, '89. Did well and was sold as sound.

22.—Mare. Navicular. Operation Nov., '89. Observed 5 yrs. Still in use.

23.—Gelding. Navicular (double). Operation Dec., '89. Seen for 5 yrs. Did extra well.

24.—Gelding. Navicular. Operation Jan., '90. Good worker for 2 yrs.

25.—Gelding. Navicular. Operation Feb., '90. Observed 1½ yrs. Sound.

26.—Gelding. Navicular (double). Operation April, '90. Did well.

27.—Gelding. Navicular (double). Operation May, '90. Worked in city for 2 yrs.; now at work on a farm.

28.—Gelding (thoroughbred). Navicular. Operation May '90. Observed for one yr., during which he won two races, and remained sound.

29.—Gelding. Navicular (double). Operation Aug., '90. Observed for 2 yrs. Remained very well, and was sold.

30.—Gelding. Navicular (double). Operation Sept., '90. Driven for 2 yrs. and then sold.

31.—Gelding. Navicular. Operated Feb., '90. Observed 3½ yrs. and animal still at work.

32.—Gelding. Navicular. Operation Feb., '91. Sold for large price 1 yr. after.

33.—Gelding. Navicular. Operation April, '91. Was killed by accident while working 1 yr. later.

34.—Mare. Navicular. Operation April, '91. Broke down in 1 yr.

35.—Gelding. Navicular (double). Operation May, '91. Observed for 3 yrs. Still working.

36.—Gelding. Navicular. Operation May, '91. Observed for 3 yrs. In March, '94, died of spinal meningitis.

37.—Gelding. Navicular. Operation June, '91. Did well and was sold.

38.—Gelding. Navicular. Operation July, '91. Did well.

39.—Mule. Navicular. Operation July, '91. Observed 3 yrs. Still working.

40.—Gelding. Navicular. Operation May, '89. Observed 5 yrs. Results good—still at work.

41.—Gelding. Navicular. Operation May, '89. Did well.

42.—Mare. Navicular. Operation May, '89. Observed 4 yrs. Did well.

43.—Mare. Navicular. Operation June, '89. Observed 5 yrs. Still in use.

44.—Gelding. Navicular. Operation Aug., '89. Did well for 2 yrs.

45.—Gelding. Navicular. Operation Oct., '89. Well for a year and sold.

Case 46.—Mare. Navicular. Operation Aug., '87. Serviceable for 2 yrs. In March, '88, removed neuromas. In 1889 she was breaking down and was destroyed.

47.—Gelding. Navicular (double.) Operation, June, '93. Not lame at present.

48.—Gelding. Ringbone (posterior). Very lame. Operation, June, '93. There was no improvement and animal was destroyed in Aug., '93.

49.—Gelding. Ringbone (posterior). Operation, May, '94. Not lame July, '94.

50.—Mare. External side bone. Very lame. External plantar neurectomy, May, '94. Sound, Aug., 94.

51.—Gelding. Navicular (chronic, and lameness intense). Operation, Jan., '90. May 23,' 90, broke down.

52.—Gelding. Operation, April, '89. After several months the foot sloughed off.

53.—Mare. Chronic laminitis. Operation, May, '89. Autumn of '89 not lame.

54.—Mare. Navicular disease. Operation, Sept. '91. In 1 mo. the feet sloughed.

55.—Mare. Navicular. Operation, Feb., '92. Sound for 9 mos., then became lame.

56.—Gelding, Navicular. Operation, Jan., '91. Relieved for 1 yr. In July, '92, was a little sore.

57.—Gelding. Ringbone. Operation, Jan., '91. Lame after 6 mos.

58.—Gelding. Sidebone. Operation, Feb., '91. No relief.

59.—Gelding. Ringbone. Operation, Feb., 91. No relief.

60.—Gelding. Navicular. Operation, Feb., '91. Observed for 1½ years. Sound.

61.—Gelding. Navicular. Operation, Nov., '90. Seen during 4 yrs. Sound.

62.—Gelding. Navicular. Operation, Dec., '90. Relieved for 1½ years. Now lame.

63.—Gelding. Ringbone. Operation, July, '92. At present sound.

64.— " " " " Sound for 3 mos, then lame.

65.—Gelding. Ringbone. Operation, Sept., '92. Slightly lame in Jan., '94.

66.—Mare. Navicular. Operation, June, '89. In good condition in April, '90.

67.—Mare. Navicular (double). Operation, Jan., '88. Good condition in Jan., '90.

68.—Mare. Navicular for 3 yrs. Operation, July, '92. Still sound in June, '94.

69.—Gelding. Navicular. Operation, 1881. Sound during the 6 mos. he was under obervation.

70.—Gelding, Navicular (recent). Operation '82. Lost foot in 14 days.

71.—Gelding. Navicular (chronic). Operation '82. Relieved for the 2 yrs. he was observed.

72.—Gelding. Navicular (acute). Operation '90. Lost foot.

Case 73.—Mare. Navicular. Operation '92. Recovered from a threatened separation of the hoof, and has not been lame for 2 yrs.

74.—Mare. Ringbone. Operation '92. Sound foot for 1 yr., then destroyed for streetnail.

75.—Mare. Navicular (chronic). Operation '91. Lost foot in 3 mos.

76.—Mare. Navicular (chronic). Operation '90. Lost foot.

77.—Gelding. Navicular. Operation '92. Artery was cut and foot was lost.

78.—Gelding. Navicular. Operation Feb., '91 (low). Slight relief. Operation March, '91 (high). No lameness in July following. Later, degeneration of tendons and animal was destroyed.

79.—Mare. Ringbone. Operation Aug,. '91. Not lame. Degeneration in foot in 3 mos.

80.—Gelding. Navicular. Operation Aug., '91, (low). Little improvement. Operation Sept., '91 (high). No lameness. Perforans and perforatus ruptured in 4 mos.

81.—Mule. Navicular. Operation Feb., '92. Degeneration of foot in 30 days.

82.—Gelding. Navicular. Operation Mar., '92 (low) with slight relief. Operation Apr., '92 (high). Has been working daily for the past 2 yrs.

83.—Filly. Congenital (?) ringbone. Operation Apr., '92. Permanent relief. In Apr. '94 the exostoses were much reduced.

84—Mule. Ringbone. Operation May, '92. Permanent cure. Apr. '94 the exostoses were much smaller.

85.—Gelding. Navicular. July, '93 (low). Little improvement. Operation Aug., '93 (high). Sound since.

86.—Mule. Exostosis on external side of second phalanx. Operation Sept. '93 upon exostosis and the external nerve. Aug., '94 sound.

87.—Gelding. Ringbone (posterior) involving second and third phalanges. Operation Sept., '91. Sound in Aug., '94.

88.—Gelding. Enlargement of flexor tendons below the fetlock. Operation, Oct., '92. Sound ever since.

LOW NEURECTOMY.

1.	Gelding.	Navicular.	Operation	Sept., '92.	Not lame Aug., '94.
2.	"	"	"	Feb., '86.	Not lame 1½ years later.
3.	"	"	"	Jan., '91.	Not satisfactory. Sold 6 months later.
4.	Mare.	"	"	Jan., '88.	Improved. Became sore.
5.	"	"	"	Feb., '89.	Improved and serviceable,
6.	"	"	"	Feb., '89.	Did well.
7.	Gelding.	"	"	Jan., '89.	Not satisfactory.
8.	"	"	"	July, '89.	Doing well when seen one year later.
9.	"	"	"	Oct., '89.	Not satisfactory.
10.	"	"	"	July, '89.	Passed as sound by a veterinarian after one year.

11.	Gelding.	Navicular.	Operation,	Nov., '89. No history.
12.	"	"	"	Oct., '88. Sound in '92.
13.	Mare.	"	"	Oct., '89. Sound in '94.
14.	Gelding.	"	"	Oct. '90. Unsatisfactory.
15.	"	"	(double) "	Oct., '90. Destroyed after 2 years on account of blindness.
16.	"	"	" "	Oct., '92. Sold as sound in 6 months.
17.	Mare.	"	"	Dec., '88. Lame afterwards.
18.	Gelding.	"	"	April, '89. Driving well in Aug., '94.
19.	"	"	"	Feb., '90. Working in Aug., '94.
20.	"	"	"	1890. Sound for 1 year. Nerves reunited.
21.	"	"	"	April, '93. Sound for 1 year. Nerves reunited.
22.	Mare.	"	"	Feb., '89. Lame 8 months later.
23.	"	"	"	March, '90. Lame 5 months later.
24.	"	"	"	April, '90. Sound in '94. Trots in 2.40.
25.	Gelding.	"	"	Sept., '91. Sound in '94.
26.	Mare.	"	"	March, '92. Sound in '94.
27.	Stallion.	"	"	April, '93. Sound for several months.
28.	Gelding.	"	"	June, '93. Not lame till autumn '93.
29.	"	"	"	" Lame after 5 mos.
30.	"	"	(double) "	July, '93. Sound till death 1 yr. later.
31.	"	"	"	July, '93. Not lame in Aug., '94.
32.	"	"	"	July, '93. " "
33.	"	"	"	Oct., '93. " "
34.	"	"	"	Oct., '93. " "
35.	"	"	"	Oct., '93. " "
36.	"	"	"	Jan., '91. Serviceable in Aug., '94.
37.	"	"	"	'93. Relieved for 1 yr. Some return of lameness.
38.	"	"	"	'93. Degeneration in 48 hours. Opposite foot began to slough from high operation.
39.	"	"	(double) "	'92. Apparently sound in Aug., '94.
40.	Mare.	"	"	Jan., '90. Permanent relief. Foot in better form.
41.	"	"	"	Jan., '90. Permanent relief. Observed for 4 yrs.
42.	"	"	"	Jul., '90. Serviceable. Never entirely relieved.
43.	"	"	"	Jul., '90. Observed during 4 yrs. Much improved.
44.	"	"	"	Jul., '90. Much improved.
45.	Gelding.	Sidebones.	"	Nov., '90. Slightly improved.
46.	Mare.	Navicular.	"	Nov., '90. Much improved.
47.	Gelding.	"	"	Nov., '90. Sound till death, 1½ yrs. later.
48.	Gelding.	"	"	Dec., '90. Permanent cure. Sold sound 3 yrs. later.

49. Gelding. Navicular. Operation, Jan., '91. Serviceable 3½ yrs. later.
50. Mare. " " Jan., '91. Slightly improved.
51. " " " Feb., '91. Slight lameness in May, '94.
52. Gelding. " " March, '91. Slightly improved.
53. " Fracture of navicular bone. Operation March, '91. Much relief. Slight lameness remained.
54. " Navicular. Operation April, '91. Permanent cure. Not lame Jan., '94.
55. " " " April, '91. Not lame in Dec., '93.
56. " " " April, '91. Lame after 2 mos.
57. " " " May, '92. Doing well Aug., '94.
58. Mare. " " May, '92. Doing well Aug., '94.
59. Mule. Ringbone. " May, '92. Doing well Aug., '94.
60. Gelding. Navicular. " June, '92. Much improved.
61. " " " June, '92. Much improved.
62. Mare. Chronic laminitis. Operation July, '92. Much improved.
63. Gelding. Ringbone (low). " July, '92. Much improved.
64. Mare. Navicular. Operation July, '92. Sound Aug., '94.
65. Gelding. Punctured sole. Operation August '92. Sound August, '94.
66. Mare. Navicular. " Sept., '92. Serviceable Aug., '94.
67. " " " Sept., '92. Little lame, Aug., '94.
68. Gelding. " " Oct., '92. No relief. Destroyed.
69. " " " Oct., '92. Slightly improved.
70. " " " Nov., '92. Much improved.
71. Mare. Ringbone. " Dec., '92. Slightly lame.
72. Gelding. Fracture second phalanx. Operation Dec., '92. Working daily.
73. Mare. Navicular. Operation Jan., '93. Very little lame.
74. Gelding. " " Jan., '93. Greatly improved.
75. Mare. " " Feb., '93. Killed.
76. Gelding. Sidebones. Operation, Feb., '93. Very little improvement.
77. Mule. Low ringbone. " Feb., '93. Very lame; working.
78. Gelding. Navicular. " March, '93. Greatly improved.
79. Mare. " " March, '93. Greatly improved.
80. Stallion. " " April, '93. Greatly improved.
81. Gelding. " " May, '93. Slightly relieved.
82. Mare. " " May, '93. Greatly relieved.
83. " " " June, '93. Failure. Killed.
84. Gelding. " " June, '93. Sold, improved.
85. Mare. " " July, '93. Greatly improved.
86. Gelding. Ringbone. " Aug., '93. Not lame. Ringbone smaller.
87. Mare. Navicular. " May, '91. Not lame, Aug., '94.
88. Mule. " " June, '91. Not lame, Aug., '94.
89. Gelding. " " June, '91. Little relief. Became quite lame.
90. Gelding. Navicular. " June, '91. Not lame, Aug., '94.
91. " " " Aug., '91. Slightly lame.
92. Mare. " " Sept., '91. Slightly improved.

93.	Mare.	Navicular.	Operation,	Oct., '91.	Serviceable, Aug., '94.
94.	Gelding.	"	"	Oct., '91.	Serviceable, Aug., '94.
95.	Mule.	Sidebones.	"	Oct., '91.	Relieved, Dec., '93, slightly lame.
96.	Mare.	Navicular.	"	Feb., '92.	Permanent cure. Not lame, Aug., '94.
97.	Mare.	Low ringbone.	"	Feb., '92.	Serviceable. Slighly lame, Aug., '94.
98.	Mule.	Navicular.	"	Feb., '92.	Permanent cure. Not lame, Aug., '94.
99.	Gelding.	Navicular.	"	March, '92.	Unsuccessful.
100.	Mare.	"	"	April, '92.	Slightly lame, but serviceable in Aug., '94.
101.	Gelding.	"	"	April, '92.	Slightly lame.
102.	Mare.	"	"	April, '92.	Still lame (brood mare).
103.	"	"	"	April, '92.	Sound 6 mos. and sold.
104.	Gelding.	"	"	March, '93.	Sound 8 mos.
105.	"	"	"	Nov., '93.	Sound Aug., '94.
106.	"	" (double)	"	Aug., '93.	Sound Aug., '94.
107.	"	" "	"	May, '92.	Not quite sound Aug., '94.
108.	Mare.	"	"	May, '92.	Perfectly sound Aug., '94.
109.	Gelding.	"	"	Aug., '92.	Serviceable Aug., '94.
110.	"	"	"	June, '93.	No improvement.
111.	Mare.	"	"	July, '93.	Sound 10 mos. Trotted many races.
112.	Gelding.	"	"	Oct., '93.	Sound Aug., '94.

For the collection of the statistics which form the basis of this paper, I am in a great measure indebted to some of my professional friends, among whom I take pleasure in mentioning Drs. Budd, Eves, Felton, Harker, Hart, Hinebauch, Michener, Muir, McKillip, Ridge, Rodgers, Schreiber, Sellers, Senseman, Charles Williams, and W. L. Williams, most of whom share my opinion in this operation. I have requested these gentlemen to select their cases, good, bad, or indifferent, irrespective of the results, and have endeavored to collect them in such a manner as one would meet them in a general practice. The table contains 231 cases, and indicates the disease, the time of operation, the result, and the termination when such is known. All cases date prior to January 1, 1894. Let me say these do not represent the whole of the favorable results, because many are recent, the animals are still sound or serviceable and may remain so for some years. Thus a case which in the table is of one year or two years duration and still sound may, if

followed, be found to remain so for two or three years longer. This must be taken into consideration in formulating conclusions.[1]

Of the 231 operations, 128 are digital (low) and 103 plantar (high). In 226 of them, the age of animals was as follows:

1	3 yrs.	23	12 yrs.
1	4 "	3	13 "
5	5 "	6	14 "
16	6 "	14	15 "
20	7 "	5	16 "
37	8 "	1	17 "
33	9 "	7	18 "
30	10 "	1	19 "
5	11 "	3	20 "

DISTRIBUTION OF THE SEXES.

Gelding	164	Pony	1
Mare	50	(?)	1
Stallion	2		
Mule	12		231

DISEASES REQUIRING OPERATION.

Navicular arthritis	one foot 163	Punct. sole	1
	both feet 31	Enlarged flexor tendons	1
Ringbone	25	Laminitis (acute)	1
Sidebone	5	Laminitis (chronic)	2
Fract. navic. bone	1		
Fract. second phalanx	1		231

Period of soundness or service, and termination of the eighty-nine high operations. Most of them, even some of the oldest, are so at the present time:

NAVICULAR ARTHRITIS. SIXTY-EIGHT CASES.

[2]1	10 yrs.	4	1½ yrs.
1	7 "	13	1 "
3	5½ "	1	9 mos.
5	5 "	1	8 "
3	4 "	2	6 "
1	3½ "	1	4 "
3	3 "	1	3 "
14	2 "	2	2 "

RINGBONE.

1	5 yrs.	1	3 "
1	2½ "	2	2 "
3	1 yr. (1 then little lame).	1	six mos. (then little lame).
1	3 mos. (then little lame).	2	no improvement.

[1] The author does not consider the word *sound* in its technical sense.
[2] These two cases, reported by Dr. Oyler, of Harrisburg, are not mentioned in the table.

SIDEBONE.

1 . . . . . sound. 1 . . . . . no relief.

ENLARGED FLEXOR TENDONS (below fetlock).

1 . . . . . 2 yrs. 7 . . . . . did well.
Relieved, 1 . . . . . 2 "

ACUTE LAMINITIS, 1 (suppuration).

CHRONIC LAMINITIS, at 4 mos., sound.

RETURN OF LAMENESS.

1 . . . . . 2 yrs. 1 . . . . . 9 mos.
2 . . . . . 1½ " 1 . . . . . 6 "
2 . . . . . 1 " 1 . . . . . 3 "

NEUROMAS.

2 . . . . . 2 yrs. 1 . . . . . 6 mos.

DEGENERATION OF FOOT.

Breaking Down of Tendons.	*Suppuration of Foot.*
1 . . . . . 2 yrs.	1 . . . . . 1 yr.
1 . . . . . 1 yr.	1 . . . . . 8 mos.
1 . . . . . 5 mos.	2 . . . . . 3 "
2 . . . . . 4 "	1 . . . . . 2 "
2 (ringbone) . . . . . 2 "	2 . . . . . 1 "
—	2 . . . . . (?)
7	1 . . . . . 14 d.
	1 immediately.
	1 " acute laminitis.
	—
	12

In the majority of cases the degeneration of the foot took place within the first year, and earlier than that of the tendons.

SIXTY-EIGHT CASES OF NEURECTOMY (Plantar).

48 sound or serviceable from 1 to 10 yrs.
4 did well.
13 degeneration of foot.
2 return of lameness { 1, 9 mos. / 1, 6 " (neuroma.)
1 failure.
—
68

Of these sixty-eight cases, 70.6 per cent were sound or serviceable for at least from one to ten years. The minimum is one year, but as many of them are still in this condition the average time will be still greater than is indicated by this table.

In twenty per cent the foot degenerated; in three per cent the lameness returned from reunion of the nerves or neuroma.

LOW (digital) OPERATION.

Navicular arthritis . . . . . 98 cases.

2	5 yrs.	1	10 mos.
5	4 "	1	8 "
9	3 "	2	6 "
2	2½ "	2	5 "
8	2 "	1	4 "
3	1½ "	2	3 "
15	1 yr.	1	1 "
44		10	

[1] SERVICEABLE (NOT INCLUDED IN THE ABOVE).

2	No date	Much improved	15
1	4 yrs.	Slightly "	6
1	3½ "	Unsatisfactory	12
2	3 "	Degeneration (48 hrs.)	1
4	2 "		98
10			

RETURN OF LAMENESS.

3	1 yr.	1	2 mo.
1	8 mo.	1	(?)
2	5 "		
2	3 "	12	
1	4 "		

In ringbone and sidebones (see table), digital (low) section does not usually effect a cure. The patient generally is relieved or improved, but some lameness or stiffness often remains.

Of a total of ninety-eight animals thus operated on, fifty-five per cent were sound or serviceable for a period, given in the above table as from one to five years. Fifteen per cent were much improved, making seventy per cent of the cases in which, if not practical soundness of locomotion, at least a decided improvement was obtained. I know of many such cases which have been passed by veterinarians as sound. Twelve per cent were unsatisfactory, and in one per cent degeneration of foot occurred.

[1] The lameness returned within the first year.

I have operated on, perhaps, several hundred horses during the last seven years; but, as many were hospital patients and, again, as in other cases, records were imperfect so that the animal's subsequent history is not thoroughly known to date, I know of only thirty cases of my own of which I have personal knowledge to-day. They are classified below.

HIGH OPERATION.

By Professor S. J. J. Harger.

1.	Gelding.	Navicular.	Operation Apr., '91.	Inside neuroma in 2 mos. Since which he has been sound.
2.	"	" "	July, '92.	Sound. Fast road horse.
3.	"	" (double) "	Jan. '91.	Sound Aug., '94.
4.	"	" " "	Oct, '93.	Sound 8 mos., then feet degenerated.
5.	Mare.	" (double) "	Jan., '91.	Not relieved. Near hoof suppurated in one mo.
6.	Gelding.	" " "	May, '90.	Sound for 2 yrs., then slightly sore, but serviceable.
7.	"	Low ringbone "	June, '93.	Doing well, but lost some speed.
8.	"	Navicular. "	June, '93.	Did well for 1 year. Foundered and lost a foot.
9.	"	" (double) "	Oct., '92.	Won many races dnring the year he was under observation. Developed a neuroma.
10.	Mare.	" " "	May, '90.	Serviceably sound Aug., '94.
11.	Stallion.	" "		Won races for 1 yr. Lost sight of.
12.	Mule.	" " "	Dec., '92.	Sold Oct., '93, sound.
13.	"	" " "	Dec., '92.	Foot sloughed Oct., '93.
14.	Gelding.	" " "		Foot sloughed in 5 weeks.

Plantar Operation.

2	4 yrs.	4 (not traced)	1 yr.
2	3½ "	4 Degeneration foot within	1 "
1	2 "	—	
1	1 "	14	

In seventy-one per cent the operation may be said to have been successful. Two developed neuroma. No. 8 lost the foot, the result of laminitis one year after the operation; degeneration of foot in twenty-nine per cent.

LOW OPERATION.

By Professor S. J. J. Harger.

1.	Mare.	Navicular.	Operation, Jan., '89.	Sound till April, '92.
	"	" (double).	" Oct., '93.	Lame. High neurectomy. Sound in '94. Degeneration of tendons in May, '94.

2.	Gelding.	Nav.	(d'ble.)	Operation,	March, '91.	Doing well Dec., '93.
3.	"	"	"	"	July, '91.	Relieved 2 mos. Neuromas. Went very lame and was destroyed in March, '92. The flexor tendons were contracted and adherent to the navicular bone.
4.	"	"		"	July, '94.	Neuromas after 2 mos. Little lame.
5.	"	"		"	July, '91.	Removed neuromas in 1893. Sound since.
6.	"	"	"	"	Jan., '92.	Doing well.
7.	"	"	"	"	Nov., '93.	Reoperated June, '94. Doing well, and is speedy.
8.	"	"	"	"	Aug., '93.	Doing well Aug., '94.
9.	"	"		"	Feb., '90.	Sound 3 yrs. Died from injury.
10.	Mare.	"		"	May, '93.	Serviceable, Aug., '94.
11.	Gelding.	"		"	June, '91.	Sound Aug., '94.
12.	"	"		"	July, '91.	Sound Aug., '94. Very speedy.
13.	"	"		"	Sept., '92.	Sound Aug., '94.
14.	"	"		"	March, '93.	In 1 mos. lame from neuroma.
15.	"	"		"	Nov., '91.	Sound 18 mos. Still serviceable.
16.	"	"		"	May, '90.	Sound 3 yrs.

DIGITAL OPERATION.

6 (at present)	. 3 yrs. (two died.)	2 (at present)	1 yr.
2 " "	. 2½ "	3 (neuroma)	2 mos.
2 " "	. 2 "	—	
1 " "	. 1½ "	16	

Eighty-one of these operations were satisfactory.

From the above records what conclusions can be drawn? Do they warrant us to recommend the operation to our client, or shall we tell him, in the ordinary paraphrase, "sell your horse?" The reply, in my opinion, should be in the affirmative, always, however, keeping in mind the indications and contra-indications. My results have perhaps been a little more satisfactory than those of most others, due probably to the manner of selecting the cases. The surgeon practices very few operations of which sixty to eighty are satisfactory to him and to his client, and especially with so little expense and time required until the animal is able to resume his work. Without the operation the animal is generally worthless. Make allowances here for incorrect diagnoses and unskilfulness in operating, and the prognosis will be still more favorable.

In choosing between the plantar and the digital operations, one must be guided entirely by the existing conditions, that is, the distribution of the nerve filaments to the diseased parts. The former removes the lameness more effectually, and it is not so likely to recur ; but the possibility of interference with the gait and degeneration of the foot are greater. In the latter I see absolutely no danger, excepting a more frequent recurrence of the lameness and at times incomplete removal of the pain. Whenever the local conditions warrant it I recommend the low operation in preference to the high.

The after treatment is simple. Suffice it to say that the bandages should be removed only every three or four days, and the feet placed daily into a foot-bath containing corrosive sublimate or creolin. In this way I have often obtained union by first intention. The patient should be at rest for the first ten days, and then have gentle exercise until the end of the third week, in order to regain the normal use of the foot and to allow the blood-vessels to resume their normal condition.

ABSTRACTS.

TRAUMATIC PERICARDITIS IN THE COW. SPONTANEOUS EXPULSION OF THE FOREIGN BODY. RECOVERY.

M. Beauvais reports a case in which the symptoms indicated cardiac trouble probably of traumatic origin. The animal was not destroyed and in three days there was a decided amelioration of the general condition. The præcordial region was very sensitive and on exploring this region a sharp metallic point could be felt passing through the skin. It was extracted with a pair of pincers and found to be a needle five and one-half centimeters in length. From this time on the animal rapidly recovered.—*Revue Vétérinaire*, April, 1894.

COCAINE FOR THE SUPPRESSION OF THE SECRETION OF MILK.

It has been demonstrated that cocaine in the treatment of painful fissures of the teats has the inconvenience of diminishing the lacteal secretion. This led to its application in completely suppressing this secretion. A five per cent solution composed of equal parts of water and glycerine is applied with a pencil upon the skin five or six times daily. In all cases the function was suppressed in from two to six days. No inconveniences have followed this treatment. The surface of application need not be very extensive and, the absorption of the drug not being very rapid, there need be no fear of constitutional symptoms. The physiological action of the drug in this process consists in the removal of the sensibility of the nerve filaments in the glands. The nerves being paralyzed by the cocaine does not either by direct or reflex irritation increase the vascularity of the glands, nor stimulate the secretory glands; in other words, suppression of secretion is due to a local anæsthesia.—*Bulletin Méd. du Nord.*

LAPARO-CYSTOTOMY IN A BITCH.

Hendricks and Liénaux examined a sky-terrier bitch which had symptoms of dysuria for some time and had been treated unsuccessfully. A laparotomy was practiced with ordinary antiseptic precautions upon the patient previously anæsthetized with chloroform and morphine. The incision of the inferior abdominal wall extended from the umbilicus to within a centimeter of the anterior border of the pubis and the peritoneum was opened for about five centimeters. The fundus of the bladder appeared vascular under the peritoneal layer which covered it. Pelvic exploration with the finger only revealed a hard, round body in the interior of the bladder, which could only be a calculus. The bladder was drawn outside of the peritoneal cavity and a transverse incision made into the fundus. The wound caused considerable hemorrhage in consequence of the muscular hypertrophy of the organ. Two sets of sutures were applied: one for the mucous layer, the other for the serous and muscular layers. These sutures, made of antiseptic catgut, aided by the contraction of the organ itself perfectly occluded the incision. The operation terminated by the antiseptic washing of the abdominal cavity, the insertion of sutures and a compress bandage around the abdomen. The animal was subsequently treated with brucine and Bordeaux wine for several days. There were no complications and the dog rapidly made a permanent recovery. —*Annales de Médecine Vétérinaire*, May, 1894.

PROCEEDINGS OF SOCIETIES.

VIRGINIA STATE VETERINARY MEDICAL ASSOCIATION.

NORFOLK, Va., September 7, 1894.

The regular meeting of the Virginia State Veterinary Medical Association was held at the Atlantic Hotel, Norfolk, Va., August 15, 1894.

There were present Dr. W. H. Harbaugh, president; Drs. E. P. Niles, T. A. Donaldson, J. H. Adamson, J. T. Bushman, George C. Faville, William T. Gilchrist, and others. This society was incorporated by act of the Legislature during its last session, and the growing interest among the veterinarians of the State in questions of interest to the Association is encouraging.

Many subjects were brought forward for discussion that were of importance.

The committee upon statistics made a partial report which was interesting. Through this committee was reported a case of weak knees in a stallion "which seemed to have contracted the weakness from the sire whose offsprings are noted for the same trouble."

Cases of hereditary "periodic ophthalmia" were reported and the question raised as to whether mules ever go blind from this cause.

There were several cases of hereditary rheumatism reported from the same committee. In the discussion Dr. Niles advanced the idea that rheumatic affections are to be classed with the malarial disorders.

The committee on resolutions reported as follows:

WHEREAS, The Veterinary Medical Associations of the different States and the United States Association discountenance the use of specific remedies and the endorsement of such, and

WHEREAS, It is impossible to properly diagnose diseases by mail, Therefore be it

Resolved, That this Association disapproves of the indorsement of specific medicines by certain veterinary colleges;

Resolved, That the Association discourages answering queries in the various agricultural and other papers under the head of "Veterinary Editor."

These resolutions were adopted.

Dr. M. D. Hoge, M. D., of Richmond, aud Dr. Drake, of Leesburg, were elected to membership.

Dr. George C. Faville was elected secretary of the Association. After the transaction of their routine business, Dr. Faville read a paper on "Maladie du Coit," which was listened to with much interest. The paper was illustrated by specimens that were procured during the work of stamping out this disease in Nebraska. After a recess for supper, the Association was called to order at 8 o'clock p. m. to listen to a very interesting paper on "Tuberculosis," by Dr. E. P. Niles, of the Agricultural College at Blacksburg. This paper was followed by a spirited discussion.

The fact that the veterinary profession is small in numbers in this State and that the State is crowded with empirics who fail to appreciate the gravity of this disease is very apparent.

The fact that a so called veterinarian had given a certificate of health for a large dairy in Richmond was shown by the published certificate which was used as an advertisement. Speaking of this particular inspection, Dr. Harbaugh said: "I was informed that this inspector examined about one hundred cows in a half hour and pronounced them free from tuberculosis. I have made inquiries and failed to find a single instance where he tested with tuberculin."

After full discussion, the following resolutions were adopted:

WHEREAS, Tuberculosis is in most instances occult in its manifestations, and

WHEREAS, Inspections as generally made at the instance of interested parties are inefficient and practically worthless, and

WHEREAS, The prevalence of tuberculosis in our dairy herds is alarming in its extent and fearful in its influence upon the health of the consumers of dairy products; and

WHEREAS, Owners of dairies in this State have published certificates from so-called veterinary inspectors giving clean bills of health for their dairies which are misleading to the consumers of milk and absolutely worthless as a guide for the public, Therefore be it

Resolved, By the Virginia State Veterinary Medical Association that we deplore the lack of information that the general public has upon this question;

Resolved, That we unqualifiedly condemn the granting of certificates of health for dairies by unqualified men or after superficial examinations:

Resolved, That it is the opinion of this Association that no inspection of any dairy is of value unless made by a qualified veterinarian under municipal or State authority.

After a general discussion lasting until the "wee sma' hours," the Association adjourned to meet in Charlottesville on January 3, 1895.

GEORGE C. FAVILLE, D.V.M., *Secretary.*

PENNSYLVANIA STATE VETERINARY MEDICAL ASSOCIATION.

HARRISBURG, PA., September 4, 1894.

The semi-annual meeting of the Pennsylvania State Veterinary Medical Association was held at Chestnut Street Hall and was called to order at 10.20 a. m. President Leonard Pearson in the chair. At roll call the following members responded:

Drs. Allen, Bachman, Benner, Borneman, Bradly, Conard, Felton, Foelker, J. C.; Good, Harger, Hart, Jno. R.; Hoskins, Keely, Keil, Kooker, Lintz, McAnulty, McNeil, Oyler, Pearson, Raynor, Thos. B.; Raynor, Jas. B.; Ridge, Schauffler, Stanton. As visitors, Dr. H. P. Eves, Wilmington, Del. and Hon. T. J. Edge.

Minutes of the previous meeting were read and with the addition that Drs. Cawley and Fox, whose applications were considered at the last meeting, were declared rejected, it was approved as read. The president then addressed the meeting.

The secretary then read the following list of applicants for membership:

Drs. Thomas Castor, T. J. Kean, Augustus O. Koenig, Chas. F. Oat, Arthur Salinger, C. J. Marshall, H. W. Turner, Otto G. Noack, T. S. Werntz.

A recess of fifteen minutes was then taken that the Board of Trustees might convene to examine the applications. There being three absentees in the board the chair appointed Drs. Thos. B. Raynor, Conard and Foelker, who were substituted to fill the vacancies.

The board being ready to report, the president restored order and the report of the trustees were given by Dr. Hoskins. Before reporting Dr. Hoskins called the Association's attention to the improper manner in which the applications were filled out, and urged that more care should be observed as the applications would serve as records for the future. He then reported that the committees had favorably recommended Drs. Thomas Castor, C. J. Kean, Augustus O. Koenig, Chas. F. Oat, Arthur Sallinger, C. J. Marshall, H. W. Turner, Otto Noack. The application of T. S. Werntz was laid over until the next meeting.

The recommendations of the Board of Trustees was approved when each applicant was elected singly by acclamation. The president introduced those of the elected applicants who were present.

The Corresponding Secretary's Report.

My predecessor, Dr. Ridge, furnished you with a full report on the membership of this association from the time of its organization down to the last meeting, March 7, 1894. I will therefore merely state that the membership at that time was 109. There were six new members added at the last meeting, making in all 116 active members in good standing.

The newly appointed committees, by the president, were duly notified.

The county secretaries were also notified by me, but owing to an oversight on my part not until late in the season. The six new members: Dr. J. W. Adams, Dr. W. A. H. Shieton, Dr. C. M. Earnest, Dr. E. S. Moyer, Dr. J. T. McAnulty, Dr. C. S. McKenna, were notified and furnished with by-laws, etc.

Certificates were sent out to the following new members: Dr. W. P. Miller, Dr. H. L. Marsack, Dr. H. R. Church, Dr. J. B. Seitler, Dr. S. J. Nicholson, Dr. D. B. Fitzpatrick, Dr. Warren S. Rhoads, Dr. Howard B. Felton. I wrote the following month to each of the gentlemen, asking them to acknowledge receipt of the same. I have received an answer from but one of these gentlemen—Dr. Marsback.

Through the kindness of Drs. Hoskins and H. J. McClelland, I was furnished with some 230 veterinarians practicing in the State of Pennsylvania, to each of whom I wrote a letter enclosing application blank. I also urged them to fill out the same and after having them approved by some member of the association to return them to me.

I further enclosed a program and requested them to attend this meeting, etc.

I understand the president has also sent out application blanks to all graduates of the University so that by the next meeting we will be able to present a large

number of applicants. I shall endeavor and hope that each member of this association will assist me, as far as in his power to obtain as many new applicants as possible, and try particularly to add one new member from each of the thirty-six or thirty-seven counties, that remain unrepresented in this association.

I have had bills printed for the convenience of the secretary, in sending out the accounts from time to time. On each bill has been printed—Corresponding Secretary—For the Treasurer, etc. This will be a great help, now that the Association's membership is becoming quite large.

All the committees have been notified that reports would be expected, and all the chairmen answered promptly their intention of being on hand.

Programs were received of this meeting on August 22, and were sent out to each member, on the same day. Application blanks, bills and circulars were also enclosed. One notice only returned, that of Dr. W. L. Nunan, having changed his address.

Notice was sent to Governor Robert Pattison, Secretary Edge of Board of Agriculture. Also to some sixteen or twenty secretaries of the various State societies and graduates' associations.

A letter was received from Secretary Edge acknowledging receipt of invitation and stating his intention of being present unless his official duties prevented.

I received notice from the president of his appointing Drs. J. Hart and W. S. Kooker as delegates to the New Jersey State Veterinary Medical Association. There was one letter of importance received, that of Professor C. H. Sweetapple, of Ontario Veterinary College. In reference to the resolution passed by this association last March, the faculty of the Ontario Veterinary College for abbreviating the course of veterinary education. The letter was published in the *American Veterinary Review.* I wrote to Professor Sweetapple that the subject would be brought before the association at the next meeting in September, etc.

September 4, 1894.

It was moved that the report be accepted and filed. Carried. Next followed the treasurer's report. Upon motion the chair appointed the following auditing committee: Drs. Schauffler, Kooker and Thomas B. Raynor, who approved the treasurer's report. At this point Dr. Hoskins referred to the action taken on a letter by Dr. James Waugh in relation to the Ontario Veterinary College advertising for three months students, and stated that Dr. C. H. Sweetapple, one of the faculty of said college, had written to this Association and denied the charge, and in the absence of Dr. Waugh he moved that a committee of one be appointed by the chair to thoroughly investigate the matter and report at the next meeting. The chair appointed Dr. Harger. The question of increasing the funds arose, but at the suggestion of Dr. Harger it was deferred until after the report and discussion on legislative matter. Next in order was collection of dues, wherein the members took an active part. At 12 o'clock a motion was entertained to adjourn for luncheon and to reassemble at 1.30 p. m. Carried.

The *afternoon session* was called to order at 1.45 p. m., President Pearson in the chair. The report of the committees being in order, President Pearson called upon Dr. Hoskins, chairman of Committee on Legislation. He reported violations of the Veterinary Registry Law. Joseph Fry, of Warren, Pa., and Dr. Keller, of Lycoming county, whose cases were held under advisement, subject to a more thorough investigation, the results of which to be reported at next meeting. He

also submitted the outlines of two bills: The Veterinary Examiner's Bill and a Meat and Milk Bill, which were discussed at some length by Drs. Harger, Kooker, Ridge, Jno. B. Raynor, Good, Oyler, Schauffler, Hoskins, Conard, Pearson, Thos. B. Raynor, after which it was referred back to the committee.

A resolution was offered by Dr. Kooker that the Association pledge itself to pay $100 towards defraying the expenses of the corresponding secretary and committee in endeavoring to secure the passage of the bills. Upon motion it was carried. Report of Committee on Sanitary Science and Police, by Dr. Conard, chairman, was also listened to with much interest. It was moved and seconded that a vote of thanks be tendered Dr. Conard for the report rendered, which was carried unanimously. Dr. Adams, chairman of Committee on Intelligence and Education, being absent, there was no report from that committee. Next in order was the reading of papers.

At this point the president received a telegram from Dr. Adams regretting his inability to be present on account of a delay at Trenton, but wishing success to the meeting.

The first paper called for was by Dr. Harger on the use of Mallein. Discussed by Drs. Harger and Kooker.

Upon motion a vote of thanks was tendered Dr. S. J. J. Harger for his valuable paper.

Dr. W. H. Ridge's paper being called for, was read, entitled "Eversion of the Uterus."

The discussion which followed was interesting and participated in by Drs. Conard, Kooker, Good. Upon motion, a vote of thanks was tendered Dr. Ridge.

A paper on Report of an Outbreak of Anthrax in Erie, Pa., in which cattle and horses were affected, was sent by Dr. J. B. Irons, of Erie, Pa. Injuries to the Tongue of the Horse, by Dr. Houldsworth, was the next paper.

Upon motion a vote of thanks was tendered Dr. Irons and Dr. Houldsworth for their valuable papers.

After an unusual interesting meeting, wherein the members were all in a state of activity, the Association adjourned to meet at Philadelphia in March, 1895.

W. C. Benner,
Recording Secretary.

MASSACHUSETTS VETERINARY ASSOCIATION.

The regular monthly meeting of the Massachusetts Veterinary Association was held at No. 19 Boylston Place, Boston, on the evening of May 23, 1894. The president, Dr. Alexander Burr, in the chair; after the roll had been called, on motion of Dr. Peters, it was voted to dispense with the reading of the minutes.

The president then briefly introduced the subject and called on Dr. Peters to read his paper on "The Prevalence of Tuberculosis." [See paper on "Prevalence of Tuberculosis," by Dr. Peters. July number Veterinary Magazine.]

The President.—Dr. Winchester will now read a paper on "The Diagnosis of Bovine Tuberculosis. [See paper on "Diagnosis of Bovine Tuberculosis," by Dr. Winchester. July number Veterinary Magazine.]

The President.—I will now call on Dr. Parker to read on "The Sanitary Condition of Dairy Farms." [See paper on "Sanitary Condition of Dairy Farms," by Dr. J. W. Parker. July number VETERINARY MAGAZINE.]

The President.—Mr. Sessions has promised to favor us with some remarks on "The Agricultural Aspect of Bovine Tuberculosis." [See paper by Mr. Session on "The Agricultural Aspect of Tuberculosis." July number VETERINARY MAGAZINE.]

The President.—Thus far the subject of tuberculosis has been treated from the veterinary side. Various members of the medical profession, however, have kindly promised to be here this evening and to say something on the subject. I will now call upon Professor Ernst to make a few remarks.

Professor H. C. Ernst.—Mr. President and gentlemen, I came here to-night as a listener and learner, and because I felt sure from the list of papers that I should learn something that would be of value to me, and I have certainly done so by listening to what has gone before. It is a repetition of an experience I have had in other years, where circulars have been sent out asking for information in regard to cases which appeared to show a transmission of tuberculosis through milk. My replies from the veterinarians, who were kind enough to send me any reply at all, were more valuable than those I received from medical men, and so it has been to-night in the papers that have been read. There have been a number of points brought up that seem to me to be of very great value, and that I have been glad to listen to. Among the things that have attracted my attention as I have listened, in the first place, was the point that Dr. Winchester made in regard to the condition of the udder showing tuberculosis, that one of the physical signs was the nodulated, seed-like feel of the udder differentiating it from chronic or acute mastitis. The specimens I have seen in years past have usually borne out that assertion, but I have certainly seen some where it was, by any physical or technical examination, entirely impossible to differentiate the condition from mastitis, and it was only by the microscope that that differentiation could be really clear. I have now at the laboratory a number of specimens which showed at first sight the ordinary appearance of mastitis, and it is only when the high power lens is put on that the presence of tubercular growth can be made out.

That point I speak of because it would appear to be an illustration of the fact that tuberculosis in its very earliest stages, when the development first begins, has not yet gone so far as to present this nodulated appearance to the fingers.

I have been much interested to hear the assertions in regard to tuberculin. As far as my personal experience has gone with the various gentlemen who have used it, in conversation with them, the opinions seemed to be very varied. Here to-night it appears to be a pretty unanimous feeling that tuberculin does furnish a very accurate means for diagnosing tuberculosis in cattle; the other side of the question has been the demand that has been made upon me during the winter for tuberculin for just this purpose of diagnosis. I have furnished some of it, but the results that had come to me seemed to show that there is reason for the varying opinion as to its value as a diagnostic agent.

There is one point, I think, which may be of interest to the gentlemen here because I have been asked concerning it several times, and that some of them do not know, and that is, whether the use of tuberculin has any tendency to produce tuberculosis. The question arises from the feeling which some men have that

tuberculin is not thoroughly free from the active, vital, infectious principle, but, of course, that is not so. Tuberculin, if it is properly prepared, does not contain any principle which by any possibility can produce tuberculosis in a healthy animal, no matter what quantity is employed.

This table of Dr. Parker, it seems to me, is a very striking one, and a serious arraignment of somebody. I do not know that the care of the cattle from which a milk supply is obtained is under any one head, but if it is not, such a condition of things as this certainly appears to me to need attention. Secretary Sessions has said that since the agitation in regard to tuberculosis the number of cattle has decreased in this State, and that that decrease is perhaps ascribable to the fear of the farmer for the loss of his stock, because he is not remunerated for it. One or two instances have come to my knowledge where it was not because they were afraid that their cattle would be destroyed that they disposed of them, but it was because they were afraid of being obliged to keep them under healthy conditions. Milk men who keep cattle to furnish the milk supply in the neighborhood of a large city think more money can be made, of course, if they keep their cattle in cellars under these dreadful hygienic conditions, and the moment any special investigation comes and they begin to feel they will be obliged to put out more money upon their cattle, then they will go out of the business rather than run that risk. It seems to me it is fair to take this feeling into consideration as well as the point Secretary Sessions has made.

In regard to the hygienic surroundings of cattle and the specific action of sunlight upon bacilli, there is no question, of course, that these are very active factors in the destruction of the vitality of the organism. As to the exact time, I think it is hardly possible to state what that would be, but it is a well-established law that sunlight is the very best germicide that we have yet discovered.

Another point is the assertion of Dr. Biggs and the statistics showing a very large proportion of cases of healed tuberculosis that are found upon autopsy. I think those statistics are exaggerated, because I have not yet been able to find what evidence there is to prove that the cicatrices, etc., occurring in the lungs and other parts of the body are healed tubercular lesions. They are healed perhaps, but why they should be called tubercular is something that has been impossible for me to understand. I do not think it is correct to claim, because a person is found to have a cicatrix in the lungs or elsewhere, that that person has had tuberculosis, and I trust that no such suggestion as that will be adopted.

The President.—Professor Councilman, I would like to hear from you.

Professor Councilman.—I have been very much interested in the convention and papers, in that of Secretary Sessions especially, and that of Dr. Parker. I have only been present long enough to hear those papers. I have been very much interested in the subject of tuberculosis, principally, however, from the anatomical point of view, and from the point of view of comparative pathology.

In regard to the point that Secretary Sessions made as to healed tubercles, I think that that is very much overrated. We find certainly at autopsies quite a number of cases of healed tubercles. Tuberculosis, as a rule, is very slight in extent, and the evidences of it would be found in tubercular bronchial glands and in the lungs, and so on. There is a good deal of evidence that very many of these lesions certainly are tubercular. That has been shown by inoculation perhaps, but it depends very largely on the pathologist who makes the autopsy to determine what condition

should be considered tubercular in character. I know that in some schools (the Vienna school for example) these lesions are enormously overrated. It has been stated that every one has at some time or other in his lifetime been tuberculous. Certainly no such evidences of tuberculosis has been found here.

In speaking of the dangers of tuberculosis, I think that we underrate those dangers and the gravity of the disease in man, because it is something that we always have with us, and we look upon it almost as a necessity. A very large number, thirteen per cent, of the human race die of tuberculosis. That has always been the case. If there were any other disease which produced such a mortality, which destroyed so large a proportion of the human race, there would be no means that could be taken, no matter how expensive, that we would not think we were amply justified in taking, if it afforded any measure of success in controlling it. There is no other disease which can be compared with this in any way, and it is at least probable that a large number of cases come from an infected food supply. In children, especially, in the case of the tuberculous glands which we find in the neck, and which often form the starting point for the general dissemination of tuberculosis, we know that a large number of these cases arise from infection through the mouth or through the larynx. We know furthermore of cases of primary tuberculosis, in which the only evidences of the disease are ulcers in the intestines and probably in the peritoneum. We know that it is very probable that these cases also come from infection, especially in view of the fact that tubercular bacilli have been found in such a large percentage of cases in tuberculous cows. I have forgotten what Dr. Ernst's statistics were on the subject, but they showed a large per cent.

Dr. Ernst.—With no perceptible lesion of the udder at all, it was between thirteen and fifteen per cent.

Professor Councilman.—Bang's percentage is enormously in excess of that. It is, I think, fifty per cent in cows in which there were no lesions of the udder at all, and it seems to me that it is very possible that we may have an infection not only following the use of milk, but infection following the use of the flesh of tuberculous animals in case the flesh is eaten in a raw or in a semi-raw condition, because the mere fact that the bacilli of tuberculosis may be found in milk in such a large number of cases, without any trouble at all in the udder, would show that there must have been a general dissemination of the tubercular bacilli through the blood, and which might be found in the tissues without any lesion of the tissues being produced which would lead to it.

And further, with regard to tuberculin. I had three cows from an asylum in the State sent to me for examination. All three of the cows had been given tuberculin and had shown no reaction. In two of them there was a perfectly well-marked affection of the lungs, which could only be distinguished from tuberculosis by the microscope. In the third cow there was a calcareous condition of the glands, which could certainly be recognized as tuberculous microscopically. The gland was almost entirely calcified. Only portions of it could be used for examination, and those cows, as I have said, did not show any reaction at all with tuberculin. It is possible that there are many cows with tuberculosis of only slight extent where the disease has entirely run its course, and where it is only represented by the calcified remnant of the tissue. I think that it is very probable that many of these cows would not show any reaction, and these cows do not present danger in any degree.

I think, for the benefit of the public, we should do all we possibly can to lessen the mortality from tuberculosis.

The President.— Dr. Abbott, we should like to hear a few remarks from you.

Dr. Abbott.—Mr. Chairman: I should like to call attention to a man whose portrait hangs upon the wall opposite, and who expressed belief in the infectious nature of consumption at a very early period; a man who was always in advance in all investigation, Dr. Henry I. Bowditch. His statements were founded upon his observations of his own patients. He had a very large practice among consumptives, and his belief was first published as long ago as 1869 or 1870, I believe.

Such tables as we see on the chart upon the wall, it seems to me, are unusually valuable, and I wish that these twelve observations could be increased to several thousands in the State. It ought to be. It would be very convincing upon this subject to have a large number of tables prepared showing what are the actual conditions in which animals are kept for the production of milk and for slaughter. There is one column I should like to see added to that, and that is, the disposal of the dust from the stable and barn. That is one of the very important points. It has been shown by observation that dust and the disposal of dust has a great deal to do with the spread of consumption. Those industries which produce very large quantities of dust are those in which consumptives are most frequently found, and I wish that that one point might be shown, that is, as to the amount of dust and tne dusty condition of the stable, how it is disposed of, whether the animals are turned out into the open air when the stables are swept, and whether the barn floors are sprinkled in order to keep the dust from arising, because it is certainly one of the most important conditions. Dr. Winchester has very kindly referred to the circular of the State Board of Health upon this subject, which has been issued within the last few days, and some copies are upon the table for any gentlemen who would like to see them after the meeting. The subject has been taken up by many boards of health in the country; by the New York board, Pennsylvania board and Michigan board, and we have referred in that circular to the use of tuberculous meat and milk, or milk from tuberculous animals.

Much has been said here upon other points, and therefore I will confine further remarks to the point mentioned by Dr. Winchester, the relation of tuberculin to vaccination. In inquiries in regard to vaccination before the Public Health Committee this winter, this point has been brought up occasionally, not very strongly, but to some extent. Up to perhaps twenty-five or thirty years ago it was the practice throughout this country and almost all countries to vaccinate from "arm to arm," that is, by lymph taken from the arm of an infant on the seventh day and communicated to other persons by inoculation. That practice has almost entirely been done away with. We may safely say that nine-tenths of all vaccinations in the United States at this time, and in other countries, are now performed by lymph taken from the heifer. One reason for this change was the fear that vaccination from infants might convey syphilis, and there is no question that in rare cases such transmission may have happened. It was demonstrated by Dr. Corey, in London, who allowing himself to be vaccinated by such lymph, had an attack of syphilis and went through its stages and was treated for it, and that fact, together with a few accidental cases, gave great impulse to animal vaccination.

Now the question comes up whether the transmission of tuberculosis may be possible by means of vaccine. My own opinion is that it is extremely improbable, for several reasons. I give you the reasons as they are stated by some of the best foreign authorities. The reasons are principally these:

In the first place, in almost all foreign countries the animals used for vaccine culture are calves. The German law provides that calves are to be used there from three weeks old to two or three months. It is the custom in two or three or four German institutions to use young animals. Now, tuberculosis is almost unknown among calves. The slaughter house at Munich and other places have shown the fact that not more than one in 50,000 is shown to be tubercular, hence the use of such animals would be comparatively safe.

2. Another reason is the following: It is not probable that the tubercle bacilli would exist in the integumentary tissues, that is to say, in the vaccine vesicles. This point is not so easily demonstrated as the other.

3. Again, vaccine inoculation is always performed by superficial scarification, and the puncture or scarification being extremely superficial, the infectious principle of *vaccine* lymph is very easily transmitted in that way, but *tubercular* infection is not likely to be transmitted except by a deep inoculation.

Those are the three principal reasons given why tuberculosis is not likely to be transmitted by the process of vaccination. It is quite an encouraging fact (and I think it is due partly to the rapid diffusion of popular information on the subject of tuberculosis) that the disease is diminishing steadily, uniformly. The number of deaths from tuberculosis in this State is definitely known, and it has certainly diminished as far as deaths are concerned from 25 to 35 per cent. within the last forty or forty five years.

The President.—I am sorry to say that one other member who had kindly consented to be here this evening, Dr. Durgin, Chairman of the Boston Board of Health, is unable to be with us on account of illness. Before opening the discussion I am going to call upon a few present this evening to make some remarks, those who have been doing special work upon the subject themselves. I will call upon Professor Pearson, of the University of Pennsylvania.

Professor Pearson.—Mr. Chairman, I am very sorry you have seen fit to call upon me, because I have been enjoying myself and have been learning a great deal. I assure you I am repaid already for the journey I have taken to attend this meeting. The special subject of your discussion, as I understand it, is to formulate, if possible, some measures by means of which tuberculosis of cattle can be eradicated. This is such a deep and complicated question that it requires a great deal of study, and it seems to me that immature ideas upon questions of this sort should not be ventilated, but as to some other points that have been brought up I have had some little experience.

One case occurs to me which will throw a little light upon the means by which tuberculosis spreads, especially among cattle. I became familiar last fall with the condition of a herd of about 160 cattle some forty miles from Philadelphia. It was found that the percentage of tuberculosis among these cattle was something enormous. I think about 65 or 70 per cent gave a reaction after the injection of tuberculin, and when they were destroyed every one was tuberculous, and several of them had tuberculosis of the udder. The farmer who owned these cattle sent

milk to a creamery. The cream was separated and made into butter and the skim milk returned to the farmer.

Another farmer, who had a herd of thoroughbred Guernseys, was shipping milk to Philadelphia and receiving a high price for it, so he sold all of his milk and bought skim milk from the creamery to feed to the calves. He decided to have the herd tested, and the test showed that out of some eighty cows there were but two that had tuberculosis, but among the young stock there were several heifers that had tuberculosis. All of these animals which gave reactions were destroyed. The cows had tuberculosis of the lungs, while the heifers had tuberculosis of the intestines. That seemed to show rather positively that the disease must have been conveyed by the milk and that heredity or contagion had but little influence.

As to the reliability of tuberculin I might say a word, since I have had rather an extensive experience with that agent, and have tested now about 900 cows. Of these 900 cows, in the neighborhood of 200 have been destroyed, after having given reactions, and the lesions of tuberculosis were discovered in all cases. In some animals the lesions were not very evident, and it required careful examination to diagnose the condition, but in every case examined they were found. In some of these cases the disease was so extensive that it could be diagnosed without tuberculin, but in others the disease was not so widespread and could not be diagnosed without this agent. I know one instance in which the reaction came on twenty-eight hours after the injection of tuberculin, showing that the test by tuberculin is exceedingly laborious, and requires in some cases twenty-eight, and occasionally thirty-six hours.

I think that is all I have to say. These points are things that have occurred in my own experience, and therefore things that I am perfectly familiar with, but as to the legislation which should be adopted, that is another point, and one that I think requires far more consideration than I have yet given it. [Applause.]

The President.—We have with us to-night also members of the Cattle Commission of this State, and I would like to call upon Professor Lyman to make a few remarks on the subject.

Professor Lyman.—Mr. President, it is with very great surprise that I am called upon. I have enjoyed hearing the remarks that have been made and the papers that have been read. I think that now I had better not make any remarks upon the general subject. I will take this opportunity, however, to thank you and your society for the privilege of being here this evening, and I would say I have been very much instructed and interested. Very many points spoken upon are of interest to the State Board of Cattle Commissioners, and I am sure that I for one have derived a great deal of profit from the meeting this evening.

The President.—Professor Stockbridge, we would be pleased to hear a few remarks from you.

Hon. Levi Stockbridge.—This call, Mr. President, startles me. I came here to listen and learn without the remotest idea that I should be called upon to say anything. I came, I say, as a listener and learner, and my coming here has been a success. I have learned a great deal, and you may be sure I have listened intently. In regard to some of the points that have been taken up I feel very much at home. Here is this table of Dr. Parker. I feel as if I were myself in some one of the many, many barns in Worcester and Middlesex, and I might almost say in every county of the State. I have witnessed exactly what he has been described

and pictured before us. There is one point, however, which I have always preached upon when I have been in those barns which have such close quarters, closed cellars underneath and where cows are put in in October, and do not go out doors again until the following May. In those cases there is another thing taking place which is injuring the animals, and that is high feeding to see how much milk they can be forced to produce beyond the capacity of the animal to bear it. But now, gentlemen, there is another side to that matter which has been discussed here to-night, and I wish the veterinarians would explain it. I do not understand it. Some of the best barns, so far as light, ventilation and all possible hygienic conditions that can be provided — no cellars under the stable, outside of the barn proper, have had some of the worst cases of tuberculosis in this State. Can you account for it?

A voice.—Yes.

Professor Stockbridge.—I can call names, but it is not necessary. In more than one, in more than two, in more than three counties in this State where I have been at work, I can speak of barns that are model barns in all these respects, and yet there are more cases of tuberculosis in those than in poor barns. I condemn in unmeasured terms, in the strongest language I am able to use, when I go into these barns with cattle in the cellar, surrounded with water, and great piles of manure that come down from above. That seems to be an enigma, how in these first-class barns, where all the hygienic conditions are supposed to be attended to, good light, cows outside of the barn, I mean in "lean-tos," as they are called, and hay is brought into them from the house-barn,—how in those barns they can have so many cases of tuberculosis. Week after week and month after month I am called to such cases, and order the cattle to be killed, and they are coming right along. Explain it, gentlemen, if you can.

Now in relation to another matter. Gentlemen have spoken here to-night on the use of tuberculin. Dr. Winchester did not say he thought the Cattle Commissioners ought to use tuberculin for the purpose of diagnosing this disease. I know he thinks so. He might just as well say it. (Laughter). But with all the work on our hands, and making short visits to these barns, that being the best we can do, when we get there you can see we cannot go into the work with tuberculin as a means of diagnosing, for it would take twelve, eighteen or thirty-six hours in a given case, and that we cannot do. Last week I visited nine towns in this State, nine different towns scattered all over the State, and how could we use tuberculin? But we are not so green about tuberculin as we might be, and really I can say that a great deal of good in the way of diminishing this disease may be done by the use of tuberculin, and therefore I think the Commission would recommend to owners to use tuberculin, and we think that really a very great advance may be made by its use, but if you believe you are going to stamp out tuberculosis by the use of tuberculin as we stamp out contagious pleuro-pneumonia, I say, no, we will never do that. We can diminish it, but can never stamp it out. But when our medical profession treat it as a contagious disease, we shall make more advance with the bovine.

Now; I ought not to take your time here, gentlemen, to talk about this matter, but the Cattle Commission must work by law. We have got to work according to law, and do only what the law authorizes us to do, and this one matter of paying for these cattle that are slaughtered, that are tuberculous, the Cattle

Commissioners state, as a matter of principle, in our annual report that we do not think we should pay for cattle. The owner lost his animal when it got the disease, and the animal is not worth a dollar. If a man should come to you with a tuberculous cow, however slightly infected, and offer to give it to you and put it in your barn, would you allow it to come in?

I hoped Dr. Peters would say something about payment in the State of New York, and I would like to ask him the question: Has the Supreme Court of the State of New York ruled upon this question that it is unconstitutional to pay a man for an animal that is not worth anything.

Dr. Peters.—Ask Dr. Faust.

Dr. Faust.—The State of New York paid thirty dollars a head last year.

Professor Stockbridge.—Has the Supreme Court ruled on that question?

Dr. Faust.—No.

Professor Stockbridge.—That is simply a newspaper report then. I thought I would like to know about it, before our own law goes through. If you will excuse me, Mr. Chairman, I do not think I ought to occupy any more of your time. [Applause.]

The President.—I would like to call upon Dr. Faust, who has done considerable work in connection with this matter, to make a few remarks.

Dr Faust.—Mr. President, I thank you very much for the kind invitation to come to this meeting, and I would like to start in right here by saying that I can see very readily why you cannot stamp out tuberculosis,—because you will not give a poor farmer a dollar. That is why you fail. I endorse what the gentleman over there (Mr. Sessions) said, every word, and unless you do pay, you will never succeed.

I was amused when I heard Dr. Peter's paper. I am glad he went to Sunday School but he must have had a very poor teacher. The doctor says that the seven lean cows were tuberculous. Now, if you want to learn a lesson in Scripture, turn to Leviticus xxii. 22–28, and you will find a description of tuberculosis. The German text says: "Das Duerre, Das Schwinden," and not as the English translation has it. Dr. Pearson knows that language very well.

Another point. This gentleman (Professor Stockbridge) asked a question. He spoke in regard to the elegant farms and stables and wondered why tuberculosis should be found in them. That is a point worthy of consideration and certainly ought to and can be answered. Since I have been employed for the State of New York, I have examined a great many cattle. I started with Hon. Levi P. Morton's stable, and I made this remark, that if he should turn the White House in Washington into a cow stable, we could not have better sanitary conditions than his stable has. That is a fact. Out of sixty-two, young and old, I killed twenty-three in the presence of two physicians and three competent veterinarians, and they were tuberculous beyond a doubt. Aside from that there was one heifer that three competent veterinarians examined physically and all three were of the opinion that it had tuberculosis. It was tested with tuberculin, and there was no reaction. On the left side in the middle of the lung there was a dull spot. It was retested with a larger dose, but there was no reaction. And on the post-mortem there was no lesion found.

I went to Mr. E. Clarkson's place at Tivoli and quarantined his cattle because it appeared as if the whole herd were tuberculous. I used tuberculin very

carefully, and not a single case of tuberculosis was found in that stable, yet I never saw worse sanitary conditions in my life than right here; besides the cattle were starved, and the owner was a man worth millions of dollars. What was the reason of it? There had not been a bull or a heifer or a cow brought to that man's place in ten years, and previous to that time there had been no tuberculosis there. You cannot get tuberculosis without first having the germ. [Applause.]

I indorse every word that has been said here about hygienic conditions. I think, as veterinarians, we should have as much regard to sanitary conditions as the medical profession, and I think if we understand our duty we will do a great deal for the human race. I have tried to carry out these ideas. It is my aim. I am getting to be old and gray headed, but not worn out, and I hope I shall live to see the day that this old gentleman (Professor Stockbridge) is disappointed, when we shall stamp out tuberculosis, and I am going to do my share toward it. One of the last cases I had was on Long Island—I won't mention the name because it was private ground—on last Saturday I finished the killing of fifty-nine head, one cat, one dog, swine and chickens, and they were all tuberculous, and I am sorry to say the superintendent said to me, "Doctor, the worst of it is, two years ago I buried a pretty little boy, and the doctors from Brooklyn told me his sickness was caused by this milk."

I had another case at Mr. Douglas Merritt's, of Rhinebeck, where fifteen years ago I was called through the family physician to examine a heifer. I pronounced her tuberculous after a physical examination. She died a month afterwards, so it did not need a great deal of skill. That man has since lost a flock of sheep, and almost his entire herd of cows. Nineteen out of twenty-one head were killed and without a doubt all contracted it from this heifer. Dr. Traver, of the American Veterinary College, was kind enough to furnish me with the *post-mortem* results. Mr. Astor's superintendent, a nephew of Mr. Astor, himself, told me that Merritt's coachman, who was a great lover of milk, died of tuberculosis in a hospital in New York City, and he thought that, as the coachman was a great lover of milk, he had contracted it from drinking the milk from the deceased cows.

It is slow, but sure. It makes no mistake. When it gets hold of a victim he is doomed.

In regard to the test by tuberculin, I think its value is well established. I do not think it is worth while to go into details about that. It has been satisfactory where it has been judiciously, carefully and honestly used. But if a man is inclined to be lazy, he should not try to use tuberculin, because it is very hard work. In one case at Hon. Levi P. Morton's, I got the commencement of a rise of temperature in the sixteenth hour. We went to work and kept it up, and kept it up, and the temperature went up and down like a fever curve, but we carried it out for thirty-six hours after that, and it proved to be one of the worst cases of tuberculosis. In regard to the age of diseased animals, my experience is different from Dr. Peters. I find that younger animals suffer more than old ones. And of course, as has been mentioned by Dr. Peters in his paper, around cities it is worse than in the country. [Applause.]

From personal knowledge I will cite a few cases to show how herds can be infected by cattle brought from other herds. Douglas Merritt's heifer came from Mr. John D. Wing's. I killed twenty-seven head for Mr. Wing in the presence of

Professor Law. Mr. O. T. ——— bought twenty five head from Mr. Wing. Nineteen out of the twenty-five were killed, besides infecting his own herd. Mr. P. L. V. ——— bought twenty-five cows from Mr. Beck—before that I had killed seventy head on Mr. Beck's place—and all this in eight years. Since Mr. V.'s purchase, I have killed for him thirty-two head and of these twenty-nine were of his own herd, the others purchased from Mr. Beck had been sold. This tends to show that the infection is carried from one herd to another.

The President.—We have with us one other member of our profession, who has done a great deal of work upon this subject; one who has probably devoted more attention to tuberculosis than any member in this State or any member of the profession working in the State. I refer to Dr. Bailey, of Maine. Dr. Bailey, we would like to hear a few remarks from you.

Dr. G. H. Bailey.—Mr. president and gentlemen, while I feel under renewed obligation to the members of this society for the invitation extended to me this evening, I came here to learn, and I have been amply repaid for coming. I believe we are all seeking light, and if I thought I could contribute in the least degree anything that could throw any further light upon this important subject, I should be only too happy to do so, but as I look at it, entirely unprepared as I am to make any remarks, not expecting to be called upon even, I do not see that my friends have left any room for me to say anything. The gentlemen who have preceded me have discussed the subject so completely that I see nothing for me to add, or to say anything to you about any ideas I have obtained about tuberculosis.

I would like, now that I am on my feet, to correct an impression that has been widespread in certain quarters, that Maine occupied somewhat a position of hostility to Massachusetts. Nothing could be further from the truth. We have acted on the defence from the start, and are acting upon it now—never in any offensive sense. In regard to the quarantine law against Massachusetts, I feel proud of its results, and of the position I have occupied, and I feel more than ever like pursuing tuberculosis to my dying day. We have had good success under our law in Maine, in stamping out "contagious diseases" by the payment of a fair appraisal upon the basis of health, of which our State pays one-half, and I believe that whenever Massachusetts modifies her present law and affords a fair compensation to owners of animals destroyed, it will prove the "open sesame" to success. I have never discussed the matter with Professor Stockbridge (who is a thorough disbeliever in indemnity), but I have broken many lances with Dr. Lyman, and I think he is beginning to see light; and the probable appropriation of $50,000 by the present Massachusetts Legislature is a reminder to me that you realize at least, it is going to cost you something to get rid of tuberculosis. The law does not require the performance of a duty, and at the same time withhold the means reasonably necessary for its performance; and I again suggest the efficacy of the law requiring that the owners of diseased animals should not have to run too much counter to *their own interests* in submitting to the obligations to report their cases, and the *only means* of *diminishing* their *resistance* is to *establish* the *principle* of a *fair compensation* in the *case of slaughter*. It is to the principle of mutuality that recourse must be had—a principle which should be applied under the control of the State.

I do not know that the farmers of Massachusetts are any more honest than those of Maine, but with no law of indemnity, our farmers would sell you and me the

milk of their cows as long as they gave any, and the meat when they did not, and we would be buying and selling, and eating and drinking tuberculosis, as you are to day in Massachusetts. We have a great many such cattle surroundings in Maine as Dr. Parker has so faithfully described in your State, and while I did not suppose you had so many around the "Hub of the universe" as we possess in Maine, I have seen some shocking examples of unthrifty dairy stock caused by unsanitary conditions. I discovered a whole herd of cows not long since, where the animals stood two or three feet higher behind than in front, through the accumulations of their own dung throughout the entire winter of '93–94; and when I asked the farmer what advantage he thought he gained from such a state of affairs, he told me he could milk them easier when they were propped up behind. [Laughter.] Among all this filth, I was surprised to find no case of disease, while in other cases, like those of our State College for instance, where we killed the entire herd of fifty seven animals, the condition of the cattle, the ventilation of the buildings, and the care of the cows were all those of a model establishment, and this leads me to the opinion that there are some legitimate reasons why you have more tuberculosis in Massachusetts than other New England States. You have more model establishments where the cows are forced for the production of milk and butter, more highbred in bred herds, in fact more *Jerseys;* and it is among this breed that we have found three-quarters of all the cases we have ever condemned in Maine.

I suppose you gentlemen are all aware that our quarantine against Massachusetts still continues; and the facts which led to its enactment in January, 1892. Early in December, 1891, our board received notice that a cheap class of cattle were being brought by the car-load into Maine from Brighton market, and either sold for beef to low-priced consumers, or sold to farmers in Eastern Maine; and December 11 we inspected a fresh arrival of twenty-three head, among which we found five bad cases of tuberculosis. Other similar cases rapidly developed, and taken together with our previous experience with another class of high-bred and high-priced cattle, all of which had been purchased in your State for breeding purposes, and had proven to be diseased, we promptly decided to forbid further importations, and upon these facts, together with others since disclosed, we rely for the fullest justification and legality of our acts.

During 1893 and '94 we have destroyed fifteen out of twenty head of Jerseys, that came to us directly out of a large Massachusetts herd, and that have never even been in contact with a single Maine animal since the arrival; and it has only recently been discovered that the herd from which they came was diseased, and the sire of many of those sent to Maine destroyed.

Your Massachusetts Commissioners say in their last report (and I thank them for so kindly indorsing my position), "that one of the most serious obstacles to the working of their law, regarding tuberculous animals has been encountered through unprincipled butchers, many of whom are established throughout Massachusetts, and make a business of buying up old worn-out or sick cows, many of them tuberculous, for a few dollars each, killing them and disposing of the meat to unsuspecting persons to be used as food."

This is just the class of cattle that were being brought so freely into Maine, prior to our notice of quarantine, and for which there is now no market in Maine or New Hampshire. If the owners of such animals knew they would be paid a

fair compensation by the State, they would report such cases, and they would not be smuggled into the market; the whole business resolves itself into one of "hide and seek" to prevent the authorities from inspecting their herds, where the disease has been propagated for many years.

I will not take up your time this evening in making more extended remarks. I had made no preparation whatever, but I have learned a good deal about the subject in which I am so much interested; which I hope to be able to retain, and to profit by so doing.

The President.—I will now call upon Dr. Paige to make a few remarks.

Dr. Paige.—Mr. President, I do not know that I can add very much to what has been said. I have listened with a great deal of interest to the discussion so far. The matter that Dr. Parker brought up in connection with the sanitary condition of our stables, I believe to be a matter of prime importance in relation to the control of tuberculosis. Perhaps I can best illustrate by reference to a case of my own.

There is a stable in our section in which about 125 or 150 animals have been kept. It is an old-fashioned farm barn. Something like four years ago the owner of the stable had all the cattle that had been kept on that farm slaughtered on account of tuberculosis. The front of the mangers and floors and the woodwork which came in contact with the animals were removed, and after the premises were renovated they were disinfected by the use of corrosive sublimate and white-washed. A herd of cattle from the vicinity of Chicago were then put into the barn, and I believe that those animals at the time they were brought on from the West were in a perfectly healthy condition, and free from tuberculosis. What is their condition now? *A tuberculin test shows that out of 109 animals on that farm to-day there are not less than twenty-nine per cent that are tuberculous.* I think in this case that the sanitary condition of the stables had a great deal to do with the spread of the disease, and I am in doubt as to whether it is possible to to rid one of these old-fashioned stables of the infectious material. I think that is rather an important matter to take into consideration with the use of tuberculin, and so strongly do I feel upon that point that I do not recommend the use of tuberculin among cattle kept under these unsanitary conditions, and among animals which are housed in stables that we know to be infected with this principle, for I think it simply means an unnecessary destruction of a large number of animals that are not dangerous either to animals standing beside them or to human beings who use milk from them. What is the use of our destroying these animals that are so slightly affected when new animals may be put right back into the infected stable and the disease is developed in them?

When we compare tuberculosis with contagious pleuro-pneumonia in reference to stamping out, I do not think we make a fair comparison. When you take out the last animal affected with pleuro-pneumonia you are done with it until you get a new source of infection. It is not so with tuberculosis, for besides unsanitary condition you have this infectious material in your stables to deal with.

These, gentlemen, are points that occurred to me in connection with the papers which have been read to-night. [Applause.]

A gentleman asked Professor Pearson what amount of reaction he would consider as indicating tuberculosis.

Professor Pearson.—Mr. President, I do not think that we can take a fixed rise as indicating tuberculosis and follow that in all cases, as in some animals there is a greater reaction than others. Some animals will indicate a reaction of one degree while in another there is a reaction sometimes of seven degrees; and I did see one case in which the reaction was but six tenths, and still the animal had tuberculosis. If the inspection is made at night and you find even a slight rise of temperature in the morning, I take that as indicating tuberculosis, because we know in healthy animals the temperature falls during the night and in the morning it is usually one or one and a half degrees lower than in the evening, so that when it is a degree higher there is a difference of two degrees between this animal and one in a normal condition. I should take that as indicating tuberculosis. If there is no difference I should make a second test, but usually the reaction on the second test is slower than the first one.

Dr. Winchester.—In regard to the second test, my reading has been that a great many animals will react at the first test, and it may be several months before they will react again, and I would like to make the inquiry whether the animal becomes accustomed to the effect of tuberculin for a certain time after the test.

Dr. Peters.—I would like to give an instance. A week ago last Sunday I tested some cows with tuberculin and the temperature went up pretty well, about to 106 or 107, I am not able to state exactly, but there was a well-marked reaction. I reported the case to the City Board of Health, the City Board of Health reported to the Cattle Commissioners, and Dr. Osgood went out for the Cattle Commissioners to test these animals with tuberculin. The tuberculin I used was some that came from Pasteur's laboratory in Paris, and his came from the Bureau of Animal Industry at Washington. He also got a well marked reaction among the cows. He had one which went to 107.3. I don't think I had anything quite up to 107,—106 4-5, something like that. That is a case where the cattle reacted a second time; the second test being made three or four days after the first.

Dr. Osgood.—When I first began the use of tuberculin I always reinoculated those that reacted in the first instance. I began by reinoculating after three weeks. I never failed to get a high reaction except in one instance with second inoculation, and, as Dr. Peters says, my reaction was higher than his. That was at the end of three days.

Dr. Kinnell.—Mr. President, I had hoped to have heard some remarks made by the members present on the amount of tuberculin used in each dose. So far as I can learn my experience on this question has been unusual.

During the past three months I have had occasion to test eight herds with tuberculin. The individuals of these herds comprise a total of 167; of these, thirty-three gave a reaction indicative of tuberculosis; of these thirty-three, twenty-six have been slaughtered, every one of which have on post-mortem examination been found to be the subjects of tuberculosis. The lesions found have been characteristic of all stages of the disease from the earliest to the most advanced. In many of them all that could be found would be one or two little tubercular masses, not larger than a hazlenut or a walnut; while in others the lesions were of long standing and extensive distribution involving both lungs, pleuro-bronchial and mediastal lymphatic glands in one suppurating mass of tubercular disease. The dose of

tuberculin used in these tests varied from a minimum dose of one-third of a minim to a maximum of two-thirds of a minim, and in no instance was this amount exceeded.

My prescription for, say nine mature Jersey cows, is as follows:

℞ Tuberculin . . . . . m vi.
Carbol. acid solut. one per cent . . . . . m lxxxiv.
Sig.—Dose for mature cow, ten minims.

For creatures a year old I use one-third of a minim, while for older cows, of small size, I use doses varying between those two extremes.

A month ago I had occasion to test a herd which had been tested by another practitioner ten or twelve weeks previously. So far as I can ascertain the dose which was used was two and a half drops. Many members of the herd reacted, were condemned and killed; post-mortem examination fully proving the correctness of the diagnosis. But in the herd on the adjoining farm, a part of which herd he had tested at the same time, one of the cows he had tested and failed to get a reaction from and consequently had passed as all right, was slaughtered and found to be worse diseased than any animal he had condemned in either of the herds. In consequence of this, the owner of the first herd (all the members of which have been tested) did not feel very well satisfied, and had me retest the remaining eleven animals. I injected them with my usual two-thirds of a minim and got in three animals the reaction indicative of tuberculosis. These animals were slaughtered forthwith, and after death examination revealed the following conditions:

First cow: Both lungs exclusively diseased, containing abscesses of various sizes; some filled with caseous and others with liquid pus. The mediastinal lymphatic glands represented by a tubercular mass thirteen inches long and thicker than a man's arm. The bronchial lymphatic glands as large as a child's head and full of liquid pus. The pleura both sides of the chest diseased. Cow well nourished and in good condition. Had been barren the last two years.

Second cow: A tubercular mass in right lung, five or six inches in diameter, with semi-calcified walls and liquid and caseous contents.

Third cow: At upper border of right lung one tubercular mass of recent origin, about the size of an ordinary hazelnut. I thought this last case might have been developed since the original test.

I have in my experience met with such a nodule, just such a size, and showing such a state of progress in a calf six weeks old and which calf I had reason to believe was infected through the milk. Now what are we going to say to all this?

Must we say that the original dose although not causing any reaction in the diseased animals, yet affected their systems in such a way as to render them susceptible to a second test, or rather ought not we to think that a small dose is much more reliable than a large one and will obtain a reaction and give a result in cases where a large dose will prove negative. To sum them up, my experience leads me to make these assertions:

1. That the dose of tuberculin ordinarily used is unnecessarily large.
2. That a maximum dose of two-thirds of a minim is at least sufficient.
3. That a small dose may be much better than a large one, as gaining a reaction where a larger dose will have no effect.

The tuberculin used is that manufactured in Germany and imported by Schulze, Berge & Koechl.

A reaction of two degrees was taken as indicative of tuberculosis. The highest reaction obtained (a rise of six and two-fifth degrees Fah.) occurred in a cow whose lungs were found free from the disease, but the capsule of the spleen was the seat of well developed tuberculosis.

The discussion was continued in a conversational way till almost midnight, when the meeting adjourned.

JOHN M. PARKER,
Secretary.

A BILL TO REGULATE THE PRACTICE OF VETERINARY MEDICINE AND SURGERY IN THE STATE OF OHIO.

SECTION 1.—*Be it enacted by the General Assembly of the State of Ohio*, That all persons who now, or shall hereafter, practice veterinary medicine and surgery in the State of Ohio, and have not been engaged in such practice for at least three years prior to the passage of this act in the State of Ohio shall be examined as to their qualifications by a State board of veterinary examiners, to be appointed as hereinafter provided.

SECTION 2.—Any one who successfully passes the examination before the State Board of Veterinary Examiners shall receive from said board a certificate signed by the members thereof, which certificate shall state that the person to whom it is given has passed the prescribed examinations and is competent to practice veterinary medicine and surgery. A copy of such certificate shall be recorded by the clerk of said board in a book kept for that purpose which shall be open to the public inspection.

SECTION 3.—Persons who have passed the requisite examinations and received a certificate from the State Board of Veterinary Examiners, and those who have continuously practiced veterinary medicine and surgery for at least five years, and no others, shall be qualified and be entitled to be employed as veterinarians by the State Board of Agriculture, State Live Stock Commission and State Board of Health.

SECTION 4.—The State Board of Veterinary Examiners shall consist of five members. The Secretary of the State Board of Agriculture and the Secretary of the State Board of Health shall be *ex-officio* members of said board. Three members thereof shall be appointed by the governor and confirmed by the Senate for the terms respectively of two, four and six years, and every two years thereafter the governor shall appoint a member for the term of six years. Vacancies in said board shall be filled by appointment for the unexpired term. The members so appointed by the governor shall be graduates of

reputable but of different veterinary schools or colleges, and men of superior learning, personal skill and good moral character.

SECTION 5.—The board shall meet at least twice a year—in April and July—in the city of Columbus. At the first meeting the board shall organize by electing from its members a president, secretary and treasurer, who shall hold their offices for two years or until their successors have been elected and qualified. The secretary shall keep an accurate record of the business transacted and of the certificates issued as heretofore provided. He shall collect the fees to be paid by the applicants for examination and pay the same over to the treasurer and shall perform such other duties as the board may prescribe. He shall keep a correct account of all moneys received and disbursed.

SECTION 6.—The board shall receive three dollars per day while in session, and their actual traveling expenses, to be paid by the treasurer out of the fees paid by the candidates for examination.

SECTION 7.—A certificate shall be issued only when the board is satisfied that the candidate examined is well qualified and entitled to a certificate. The candidate, if unsuccessful, shall not be eligible to another examination until the expiration of one year thereafter.

SECTION 8.—Candidates shall present themselves for examination at the regular meetings of the board and shall pay for each examination the sum of five dollars, which shall accompany their application in writing, and be paid to the secretary of the board previous to the regular meeting of the board. One-half of the five dollars shall be returned if the candidate fails in the examination or if a diploma is accepted in lieu of an examination.

SECTION 9.—The board may accept a properly issued diploma in lieu of an examination; but such a diploma shall be accepted only if it has been issued by a reputable veterinary school or college, that requires course of study and gives instruction in all the various branches of veterinary science.

SECTION 10.—Whoever shall engage in the practice of veterinary medicine or surgery in violation of this act shall, for

the first offence, be fined not less than ten dollars, nor more than twenty-five dollars, and for the second offence not less than fifty dollars nor more than one hundred dollars, or be imprisoned in the county jail not more than sixty days, or both. Provided, that nothing in this act shall be construed to prohibit any veterinary advice or service in cases of emergency if rendered by a person not entitled to practice under this act. Nor shall it apply to animal castration and dehorning of cattle.

SECTION 11.—This act shall take effect and be in force on and after its passage.

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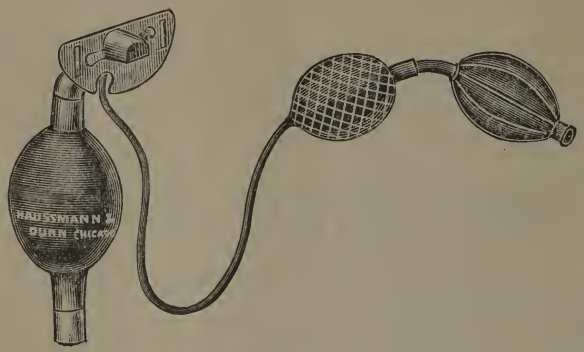

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MILK AND DAIRY INSPECTION.*

BY W. B. NILES, D. V. M.

When I promised our secretary a paper on milk inspection, the subject did not seem nearly as important to us as very recent study and investigation have shown it to be. Within the past few months this question has become one of great importance, not only to us in this State, but to other States and countries as well. It is receiving the serious consideration of sanitarians in Canada and several of our Eastern States, and will soon demand more serious attention in our own State. The most important factor in bringing this matter so forcibly to the attention of health officers and the public is the discovery that a considerable per cent of dairy cows are affected with tuberculosis, a disease capable of being communicated through the milk supply to man. Recognizing that many cases of the disease in the human family are in all probability due to the use of tuberculous milk or flesh, medical men have been quick to recognize the necessity for a careful examination of our dairy products. Hence articles pertaining to this subject are now of frequent occurrence in our medical and veterinary journals.

In this paper I shall first endeavor to show what "milk and dairy inspection" now consists of as carried out in this State, and next show the necessity of a more thorough inspection, pointing out some of the essential features of what, in my opinion, the inspection of our dairies and their products should consist.

* Paper read before the Iowa State Veterinary Association.

Milk is such a necessary and universal article of diet that its disuse is not for a moment to be thought of; hence, if any protection is afforded it must be by some system of examination or inspection. To learn of the amount and character of the protection given the consumers of milk in Iowa, I addressed letters to the State Dairy Commissioner and to the Mayors of the principal cities of the State. To the State Dairy Commissioner, Mr. W. K. Boardman, I am indebted for a pamphlet containing the State dairy laws and a personal letter from which I make the following extracts: "I would state that we make only a chemical test of the milk to ascertain the amount of butter fat contained in the same. This inspection is limited to cities of 10,000 or over." "It is the purpose of this department to have the milk inspectors of the different cities report the condition of the cows and utensils used in the different dairies and as often as possible report the sanitary conditions of the dairies." "As our funds are limited we are unable to make a very thorough examination of the latter, but can only be governed by outward appearances and surroundings." The law relative to impure milk reads in part as follows:

SECTION 1.—*Impure Milk—Penalty for violation.* That section 4042 of the Code of 1873 is hereby repealed and the following is enacted in lieu thereof: If any person shall sell or exchange, or expose for sale or exchange, deliver or bring to another for domestic use, or to be converted into any product of human food whatsoever, any unclean, impure, unhealthy, adulterated, unwholesome or skimmed milk, or milk from which has been held back what is commonly known as strippings, or milk taken from an animal having disease, sickness, ulcers, abscesses or running sore, or was taken from an animal fifteen days before, or less than five days after parturition, shall upon conviction thereof be fined not less than twenty-five dollars ($25.00) nor more than one hundred dollars ($100.00), and be liable in double the amount of damages to the person or persons upon whom such fraud shall be committed.

SEC. 2.—*Skimmed milk defined.* For the purposes of this act milk which is proved by any reliable method of test or analysis to contain less than three pounds of butter fat to the 100 pounds of milk, shall be regarded as skimmed or partially skimmed milk.

The Burlington inspector kindly answered me as follows: "I have not been especially instructed to examine cattle except as to the cleanliness of their quarters. I have always had in mind, however, when visiting the dairies to notice the general appearance of cattle and see that they were slick-looking, and I feel sure that if there were any poor disordered-looking stock I would notice them. I cannot say that I examine close enough to detect a diseased udder." In another letter he states that the wagons and cans are inspected and also barnyards and water supply; also states that he is not a veterinarian.

Dr. Paschal Davis, physician to Board of Health of Keokuk, kindly writes as follows: "The examination of cows here is simply done by noticing the herd in a bunch, and only by the Board of Health. No examination singly, nor for anything except the general condition and appearance as well as to the surroundings, water, food and stalls. We take it for granted that the cow is in good condition when she eats, drinks, etc."

Dr. Cantwell, of Davenport, says: "The test here is only for butter fat. Our inspection of dairies is for cleanliness; for cows we should have a veterinarian who understands his business." The Mayor of Cedar Rapids states: "There is no provision in any part of our city ordinance for the inspection of milk, dairy products or cattle. I believe, however, the matter of inspection is closely looked after by the State authorities." This means that the test is for butter fat only. Dr. G. A. Johnson, city veterinarian of Sioux City, to whom my letter to the Mayor of that place was referred, writes: "Our city ordinances provide for the inspection of milk as sold here, but the intent of the ordinance was to see that the wagons, cows, etc., were kept in a wholesome condition, but does not provide for an inspection of the cows. I look after the sanitation of the wagons, cows, etc." The Mayor of Des Moines referred my letter to the State Dairy Commissioner which indicates that no other test except that of the commissioner is carried out. Several cities have failed to respond to my inquiries. I infer, however, that conditions there do not differ materially from those in the cities from which replies have been received.

From the above information we learn that the inspection of milk in this State consists principally in determining the amount of butter fat which it contains. As this test only applies to cities of 10,000 and over, but a small per cent of the

amount actually sold is even subject to this test. In addition to the test for butter fat, in a few cities, some attention is paid to the general appearance of the herds and their surroundings. In no community or city as far as I have been able to learn are dairy cattle examined by a veterinarian. To the best of my knowledge the condition in other States does not differ materially from what I have described as existing here.

Is the testing for butter fat, the inspection of cows, wagons and other utensils, together with a glance at the cows and their surroundings a sufficient guarantee that the consumer is using a wholesome product? Any one having a knowledge of medicine and animal diseases will at once say no. Let us now notice the necessity for a more thorough examination. While it is essential as a matter of economy on the part of the consumer to examine for the amount of butter fat, and for the detection of any adulteration, the importance of an examination from a hygienic standpoint is of so much more importance that I shall say but little regarding its economical features. I might say, however, that a German writer, in a lengthy article on milk inspection, says that "considered from an economic point of value, milk must remain unchanged for a reasonable length of time, and it must be rich in those constituents which determine its worth as a food-stuff."

Since the application of the principles of bacteriology to dairy practice, much has been learned concerning the necessity for careful milk and dairy inspection as a hygienic measure. Very recent research regarding bacteria of milk has revealed many things heretofore unknown or only suspected. It has been found that milk may contain many kinds of organisms, some capable of producing disease (pathogenic) and some comparatively harmless (non-pathogenic). It has been shown by several investigators that milk drawn from the udder of a healthy cow is free from bacteria, and will keep for any length of time if prevented from becoming contaminated. As ordinarily milked, however, it never is free from bacteria of some kind. The sources of contamination are many. Many organisms drop into the milk during the process of milking, from the hands of the milker, from the body and udder of the cow, and from the air. Unclean pails and pans are also a source of contamination. While the bacteria which enters the milk in this way are in the main harmless, the keeping qualities of the

milk are so much higher without them, that the cleanliness of the milker, his utensils, the cows and their surroundings should be strictly observed. In the American edition of "The Principles of Modern Dairy Practice," by F. W. Woll, of the University of Wisconsin, I find bacteria of milk classified as follows:

I. Indifferent Bacteria.
II. Bacteria indifferent in milk, but active in the milk products.
III. Indirectly injurious Bacteria.
IV. Injurious Bacteria.

To this I would add a fifth class, Pathogenic or infective bacteria. Passing over group one and two, which are of little importance, we will notice briefly group three. This group contains principally bacteria which produce alkaline fermentation in milk and thus interfere with its value as a food. It is said milk infected with these organisms will not sour and the cream and butter have a repugnant taste. Organisma causing slimy fermentation may also be included in this group. This form of fermentation destroys milk for its ordinary uses, the cream is stringy and cannot be churned and the milk is unfit for use. Investigations have shown that some organisms cause this form of fermentation quickly and others after some days. Not long ago a dairyman remarked to me that during the past summer he had had much trouble with "stringy cream," as he termed it, the cream was so slimy and ropy that his customers objected to it. Great cleanliness on the part of the milker and in the dairy is the supposed remedy for this trouble. These conditions did not prevail on the farm of the dairyman mentioned. Group four contains many kinds of bacteria; the principal ones being those which produce lactic fermentation, butyric fermentation, and volatile acids in the milk. While these organisms are to a certain extent injurious to milk, interfering largely with its keeping qualities, they are not of as much importance from a hygienic standpoint as some others which we will pass on to notice. To the sanitarian the pathogenic or infective bacteria are by far the most important.

These may be divided into two classes: (1.) Bacteria derived from the teats, udder, and hands or clothing of the milker; and (2.) Bacteria present in the milk as it leaves the udder. Many ifferent diseases producing bacteria may be discussed in

connection with the first class. From wounds on the teats, udder, or on hands of the milker, the different bacteria of suppuration may enter the milk. The bacillus of anthrax and of typhoid fever may enter along with particles of litter and excrement, which frequently adhere to the udder and drop into the pail while milking. Dr. Bryce, in his pamphlet on the "Milk Supply Problem," relates an instance coming under his observation, where, after the appearance of anthrax in a herd of cattle, the milk of a cow just sickening was fed to some pigs with fatal results. In a paper read before the American Health Association, in December, 1893, Dr. J. H. Kellogg calls attention to the fact that milk may become contaminated with typhoid fever organisms by particles of excrement falling into the milk from the udder or from other sources. This he believes to be of quite frequent occurrence, and relates an experiment which tends to show that typhoid bacilli in drinking water may pass through the intestinal canal of the cow and become a source of infection. One of our own members, Dr. E. P. Niles, of the Virginia Experiment Station, in a recent bulletin calls attention to this same matter, and adds that cases of typhoid fever have been traced to milk coming from places where typhoid fever existed in the families of the persons who washed the cans and other utensils of the dairy. Scarlet fever has been communicated in a similar way, and no doubt other diseases can in a like manner be distributed.

In class (2) of *Group V* are found bacteria of very great importance. By far the most important of these is the bacillus of tuberculosis. It is the frequent appearance of this organism which makes the inspection of milk from a hygienic standpoint one of so much importance. The question as to the probability of infection by the use of milk from tuberculous cows has been much discussed, and has given rise to many experiments. Some have claimed that if the udder is not involved in the tubercular process, bacilli will not appear in the milk, while others have contended that they are in some cases present in the milk when the udder is not the seat of the disease. As it is admitted that it is utterly impossible in many cases to determine positively during life whether or not the udder is diseased, this argument seems unnecessary. Admitting the impossibility of diagnosing all cases of tuberculosis of the udder, and the presence of tubercular bacilli in the milk from

some of these cases should be sufficient evidence to condemn the use of milk from an animal having any form of the disease. Let us notice the results of some experiments and observations. Veterinarian Friis reports a study of milk sold in Copenhagen, Denmark: "Forty-six samples of milk from forty-four herds of from ten to eighty cows each were injected into eighty-four rabbits and four guinea pigs. Of these fifty-seven rabbits and all the guinea pigs died shortly after the injection, so that eighteen samples of milk were lost and but twenty-eight remained for further study. Of these, four (one-seventh) caused tuberculosis. Two of the virulent samples came from herds comprising thirty and twenty cows respectively, and in each case of these herds there was but one suspicious cow. The experiments show that by the mixing of the milk from a herd the virulence of the milk from tuberculous cases is not destroyed."

Bange in his studies found milk from sound parts of the udder as well as from diseased parts was infectious when fed to animals. He also found that when the gland was not diseased that the milk in some instances contained the bacilli. In Dr. Stone's experiments 8 per cent of rabbits and over 13 per cent of guinea pigs were successfully inoculated. In a feeding experiment over 50 per cent of the pigs and 23 per cent of the calves became tuberculous.

Dr. Ernst, assisted by Dr. Austin Peters, of Boston, made experiments with milk from cows having no appreciable udder disease, and successfully inoculated six out of fourteen guinea pigs with tuberculosis. Microscopical examination of the milk for bacilli revealed them in a number of cases. Dr. Leonard Pearson reports having fed two pigs on milk from a tuberculous cow for seven weeks; after keeping for nine weeks longer they were slaughtered and found tuberculous. The cow supplying the milk was slaughtered and extensive pulmonary lesions found, but the udder was not diseased. In the VETERINARY MAGAZINE for May, in an article headed "Death in the Family Cows," is related the case of a four-year-old child, in whose family there was no history of tuberculosis, becoming affected with tubercular meningitis. Close inquiry failing to reveal the source of infection, attention was directed to the cows supplying the family with milk, with the result that both of the cows that had furnished the milk supply reacted to the

tuberculin test. In a recent number of the *Lancet* is related an account of tuberculosis in a young lady recently returned from a convent. Her parents were robust and she had always been healthy. An investigation showed that several other cases had also occurred in the convent, and that the cow which had for nine years supplied the institution with milk had been condemned at the abattoir for tuberculosis.

Cases illustrating the probability of the communication of the disease from bovines to man are not wanting in our own State. Dr. Stalker relates finding several years ago a number of cases in an Iowa herd. These were detected by a physical examination alone, and he thinks the tuberculin test would have revealed a large per cent affected. The owner of the herd had during the two or three years previous to the visit lost five grown-up sons and daughters dying with consumption. No hereditary tendency was present in the family. A connection between the cases in the cattle and in the family seems evident. Many other illustrations might be cited, but these are sufficient to convince us of the infectiousness of milk from tuberculous animals.

In regard to the percentage of tuberculous cattle a few statistics will be in order. Professor Nocard, of France, reports finding in some dairies as high as 60 to 70 per cent of the cows affected. Dr. Salmon states that in and near our large cities from 3 to 5 per cent of the cows are tuberculous. Of the cattle slaughtered at Baltimore, Md. (mostly cows), by the Bureau of Animal Industry, 2½ to 3½ per cent were tuberculous.

The recently extended use of tuberculin as a diagnostic agent has shown a much larger per cent of tuberculous cattle than anyone has supposed existed. A test of the Pennsylvania Agricultural College herd revealed over 3 per cent affected. The Virginia College herd when tested showed almost 2 per cent. The New Jersey Experimental Station herd was found tuberculous to the extent of 70 per cent; of the Wisconsin herd 73 per cent was found diseased; the entire herd of the Maine State College, consisting of fifty-seven animals, was slaughtered as the result of a physical examination alone. The Minnesota Experiment Station herd has been recently tested, and a large number found affected. The exact figures I have not at hand. Some of these college herds were supposed perfectly healthy. They are all well cared for, and care is usually exercised in

buying new animals to enter these herds. Dr. Conrow, in No. 1, Vol. 1, of the VETERINARY MAGAZINE, describes the testing of a herd in which 55 per cent reacted to the test. In the *American Veterinary Review* of June, 1894, Dr. J. Faust, of New York, reviews his work with tuberculin. One of the herds tested was a fine herd of Ayrshire cattle. Three veterinarians had passed this herd as free from tuberculosis. On being informed by another that tuberculous animals were present, the State Board of Health was requested to make an examination. Dr. Faust in this test found 63 per cent tuberculous. Every animal which reacted showed lesions on post-mortem examination. The valuable herd of Guernseys owned by ex-Vice President Morton proved diseased to the extent of 28 per cent. Dr. Faust states this was the best herd of Guernseys he ever saw. "They are all in show condition." Other herds examined by Dr. Faust showed similar results.

Regarding the prevalence of the disease in our own State, I may say that our experiments with tuberculin conducted in behalf of the Experiment Station and undertaken for the purpose of testing the preparation as a diagnostic agent, and learning of the extent of the disease in our midst, have shown tuberculosis a much more prevalent disease than many suppose. It has been known for several years that the disease existed in some of our breeding herds, but it was not supposed that many cases existed in the same herd. Our State Veterinarian reports having seen some years ago cases in the herds of some prominent breeders. In 1885 I examined and condemned a cow that had recently come from the herd of one of our most prominent short-horn men. This proved on post-mortem one of the most marked cases of tuberculosis I have ever seen.

Through the kind assistance of one of our members, Dr. Gibson, I was able to apply the tuberculin test to a portion of a full-blooded breeding herd of Aberdeen Angus.[1] This herd is well cared for, as such herds always are. They had been kept when not in the open air in roomy quarters above ground. At the time of making the test most of the animals were fat and apparently in the very best of health; none were markedly emaciated, but three or four the attendant stated had not been

[1] The technique of the tuberculin test has been omitted, as it is described in a paper to be read by another member.

thriving for some time back. One of these showed a slight enlargement in the laryngeal region, giving rise to some difficulty in breathing. Had slight discharge from the nostrils and sat on haunches considerably. A young cow three years of age remained constantly bloated and had been this way for some time. Respiration and pulse frequent; auscultation revealed loud râles. One other showed some difficulty in breathing, and loud râle could be heard in right lung. Two others showed some trouble with respiration; in one the trouble appeared to be in the throat. In order that the owner might be better satisfied, in case all the suspicious animals should react to the test he was induced to include in the experiment some which appeared in the best of health and not related to the apparently diseased ones. In this way the five suspicious and eight others were selected for the test.

The injection of tuberculin, furnished by the Bureau of Animal Industry, was made at about 10.30 p. m. The temperature having previously been taken at 7 and 9.30 p. m. The first reading following the injection was at 8 a. m. next morning, following this it was taken at intervals of about two hours as long as it was deemed necessary. All of the suspicious cases, with one exception, showed marked reactions. In the excepted case I believe the temperature was not observed for a sufficient length of time, as later tests have shown that in a few instances the reaction begins at a late hour. Of the animals supposed to be in the best of health two out of the eight, or 25 per cent gave marked reactions. A post-mortem examination of one of the former revealed extensive lesions of bronchial glands, lungs and udder. A later post-mortem by Dr. Gibson on another showed extensive lesions involving greater portions of the liver.

Our examination of another herd containing 102 animals of different breeds and ages, made in the same way, revealed three cases of tuberculosis. A post-mortem examination confirmed the tuberculin indication in each case. The parties in charge of this herd had no reason to suppose that a case of tuberculosis existed in it. All of the animals with the exception of two which did not react to the test, were in apparently the best of health. No case of tuberculosis had been detected in the herd for about fifteen years. Care had been exercised in buying, and they had been well cared for. When not in the open air

they occupied roomy quarters in a large basement barn. It will be noticed that here was a herd in which the disease was not suspected and which had always been kept under conditions favorable to health, showing almost 3 per cent of tuberculous animals. The three cases found by the test could not have been diagnosed by a physical examination.

A test of seven animals owned by five different parties and consisting of six family cows and two heifers, revealed what I now consider one case of tuberculosis. This was in a small Jersey that had been shipped from New York State. She was rather thin in flesh, and showed slight induration of one quarter of the udder. Following the injection her temperature rose 1.4 degree above that at ten p. m., the time of injection. In the light of recent experiments I believe this indicated tuberculosis. Calling this a case of tuberculosis, about 14 per cent of this lot reacted.

The most interesting lot examined was a dairy herd near Waterloo. This consisted largely of grade short-horns obtained from different sources, most of them, however, being purchased from a former dairyman about one year previous to the test. That the herd was infected at the time of purchase seems probable, as two or three cows sickened and died soon after being bought. During the year several other cows died, some being unthrifty were sold as "canners." Attention was directed to this herd early in the summer, but, as the condition of the herd seemed for a time to improve, nothing was done until fall, when an emaciated cow was destroyed and a portion of her lung and peritoneum was sent me for examination. These tissues revealed extensive tubercular deposits, and the testing of the entire herd was arranged for. At the time of the test, with the exception of three or four animals the herd appeared in good condition. They were in good flesh, and gave a good flow of milk. One showed some difficulty in breathing, evinced by a wheezing sound. Another revealed slight enlargement of lower jaw, and two others presented slight enlargements of one or more joints. Only two were thin in flesh, but not more so than many milch cows. By a physical examination alone, without knowing that cases of tuberculosis had existed in the herd, no veterinarian could have positively diagnosed a case of tuberculosis at the time of making the test. The test revealed, however, twenty-seven cases out of fifty-one tested. These

twenty-seven gave positive reactions (a rise of two degrees or over). Ten others gave a rise of between one and two degrees. Post-mortem examination of four of those showing positive reactions revealed in every case well marked tubercular lesions. Subsequent slaughter of the suspicious animals, together with those which did not react, at one of the Chicago packing houses, where a very careful examination could not be made, revealed, when examined as carefully as time and circumstances would permit, by Dr. Stalker and some of the Bureau Inspectors, eleven additional cases of tuberculosis. A study of the results of our work shows that the disease has been found in breeding cattle, dairy cattle, general purpose cattle and family cows; and that of the 173 head tested 27 per cent, or forty-seven animals, proved tubercular; of these at least thirty-five could not have been detected or even suspicioned by a physical examination alone. While our work along this line has only begun it has established the following facts:

1. That in tuberculin we possess a reliable diagnostic agent, for in no case has a post-mortem on a reacting animal failed to reveal marked lesions of the disease. (This evidence is confirmatory to that obtained by other investigators).

2. That the number of diseased animals in a tuberculous herd is much larger than has been heretofore supposed, and also that the number of these herds in this State is larger than most of us have been believing. While I do not wish to convey the idea that all or even a majority of our herds are affected, I do wish to impress you with my belief that very many of the herds of the State are in a similar condition to those already tested.

3. That many animals affected with tuberculosis appear to the owner in perfect health and that many of these cases could not even be detected by an expert veterinarian on physical examination. Nevertheless these animals may have tuberculosis of the udder and thus give infected milk.

Knowing these facts is it not very evident that we need a more efficient inspection of our milk and dairy cattle? A hasty glance at a herd by one who is not, or even who is, a veterinarian is no guarantee that the herd may not be largely tuberculous. The cow may eat and drink as in health and still be giving infected milk. One writer states that "the milk from a tuberculous cow must be regarded with suspicion until

proven pure." We may go further and say that the milk from any cow should be regarded with suspicion until proven pure.

That milk can be proven wholesome is beyond question. To accomplish this, however, our present methods of milk and dairy inspection must be much improved. The test for butter-fat, an important one from an economical standpoint, must be supplemented by tests of far greater importance. The most important of all is the examination of the cows. This should always be done by a competent veterinary inspector.

The entire field of work, in order to lead to the desired results, may be outlined as follows:

1. All dairy herds, as well as individual cows, and all animals brought into these herds should be subjected to the tuberculin test. At frequent intervals all milk cows should be examined individually and collectively by a careful veterinary inspector. It should be made the duty of the owner or attendant of such animals to at once call the attention of the inspector to any abnormal condition noticed, such as wounds on teat or udder, enlarged udder or other sign of ill-health.

2. It should be the duty of the inspector to see that the animals are kept under good sanitary conditions, taking into consideration, ventilation, light, food, water, cleanliness of quarters, etc. The inspection should also include cleanliness on the part of the milkers, cans, wagons, and other utensils. Owners or attendants with contagious or infectious diseases in their families should have nothing to do with the handling of milk.

3. All milk should be subjected to a chemical examination to detect loss of butter-fat or other important ingredient, as well as adulterations.

With these measures in force, we believe nutritious and wholesome milk could be obtained. Want of time has prevented some important points being touched upon in this paper. The tuberculin test and tuberculosis have been given prominence because they are so intimately connected with the "milk supply problem." If what I have said enlightens some and invokes thought in others, it will not have been said in vain.

In conclusion I wish to thank those who have so kindly assisted me in the work. To Dr. C. M. Day and Mr. A. R. Wale, senior student, we are specially indebted for valuable

assistance. For literature bearing on this subject I am indebted to the *Veterinary Review*, *Veterinary Magazine*, *Journal Comparative Medical and Veterinary Archives*, the London *Lancet*, the *Veterinary Journal*, the reports of the Bureau of Animal Industry, the proceedings of the M. S. V. M. Association, the bulletins of several of our State Experiment Stations, the "Principles of Modern Dairy Practice" and the "Milk Supply Problem," a pamphlet by Dr. Bryce.

NOTES ON PARASITES—27 AND 28.

By Ch. Wardell Stiles, A. M., Ph. D.

27: *Experimental Trichinosis in* Spermophilus 13-lineatus.

[Appears simultaneously in The Veterinary Magazine and in the C. f. B. u. P., 1894, Vol. XVI.]

During a series of investigations upon trichinosis, undertaken in the States of Iowa and Nebraska this past summer under instructions from the Honorable Secretary of Agriculture, I had occasion to examine some of the smaller animals of those States, as well as to carry on certain experiments upon them.

In the 13-striped spermophile (*Spermophilus 13-lineatus*) I found an animal which, although generally supposed by the laity to be only a pure vegetarian, is in reality a true cannibal also, and which on that account seemed to promise results of practical importance in connection with the subject of trichinosis. I therefore infected a number of spermophiles with *Trichina spiralis* and found that they formed a most excellent host for the development of this parasite. In none of the spermophiles which I caught in the fields and examined, however, did I find any of the parasites in question, and I am therefore inclined to look upon the spermophiles as an unimportant factor (like the rabbits, for instance) in connection with this disease.

The results of my studies on American trichinosis—which I reduce entirely to a hygienic basis, taking hogs and rats as the chief hosts—will be published later by the Bureau of Animal Industry. I will mention here only one point in connection with the matter, *i. e.*, that the European authors who state that it is customary for the Chicago, Omaha and other large American porkpackers to feed offal to swine at their abattoirs and spread the disease in that way are entirely in error. This custom of offal-feeding does exist among small local country butchers, but I have yet to find any of the packers who ship pork to Europe, feeding offal at their abattoirs. It is, in fact, rare that hogs are allowed to remain over forty-eight hours in

the stockyards of any packing-house before being slaughtered, and during this time they are fed on grain. This delay of 24–48 hours is, of course, necessary to allow the hogs to recover from their journey on the cars, but in no way does it render them more trichinous, as the muscular stage of the disease could not develop in so short a time, even if they became infested with the parasites after reaching the yards. In packing-houses all scraps of meat, etc., are used in one way or another (as fertilizer, etc.) so that there is not the slightest possible chance for hogs to become infected from this source. In fact, it is a saying among pork-packers that the only part of the hog which goes to waste is the "squeal!"

B. A. I., U. S. Dept. of Agriculture. October 1, 1894.

28: New American Finds of Sarcosporidia.

The following undetermined species of Sarcosporidia have recently come into my possession for determination:

1. An extremely delicate *Miescheria* has been found in the heart muscle-cells of cattle by various members of the Bureau of Animal Industry force, more particularly by Dr. Theobald Smith. This form is extremely common in this locality, being present in almost every animal examined. The older an animal, the more heavily infested it is and the larger the parasites are, so that it is possible to estimate approximately the age of the animal by the appearance of the Sarcosporidia.

2. Dr. Henry Shimer, of Mount Carroll, Ill., has forwarded an undetermined Sarcosporidium from wild rabbits; Hassall has found Sarcosporidia in *Lepus sylvaticus* in Maryland.

3. While in Iowa this summer I found an undetermined species of intra-muscular Sarcosporidium very common among rats. In some localities fully seventy-five per cent of the rats were infested.

4. Hassall has quite recently found a *Balbiania* in *Setophaga ruticilla* (American Red-Start).

5. In my Notes on Parasites–18, I mentioned that our Bureau Artist, Mr. Haines, had several times noticed a peculiar condition in Maryland chickens which he thought was similar to the condition in ducks known as "measles." Several days ago Dr. V. A. Moore placed at my disposal, that I might examine it for animal parasites, the body of a chicken which had died

in one of his experiments. Throughout the muscles of the breast and legs I noticed fine whitish specks, which, upon microscopic examination proved to be very delicate intramuscular Sarcosporidia.

All of these finds will be determined and reported on in detail as soon as other work will allow.

B. A. I., U. S. Dept. of Agriculture. November 17, 1894.

NOTES ON PARASITES—29 AND 30.

By Ch. Wardell Stiles and Albert Hassall.

29. *A new species of intestinal fluke* (Distoma tricolor) *in the Cotton-tail Rabbit* (Lepus sylvaticus *Bachman*) *and in the Northern Hare* (L. americanus *Erxleben*.)

[Plates I and II.]

One of the bottles (Rack 10A.) of the Bureau of Animal Industry collection of parasites contains some very small flukes collected by Cooper Curtice, and bearing the label "1887, wild-rabbit." Curtice found the same parasites a second time and placed them in the Bureau of Animal Industry collection with the label "*Monostomum* (?) sp. undt." These are the forms mentioned under this name by Curtice[1] for *Lepus americanus*. Hassall found these same parasites in the Cotton-tail in 1891, and since that time he has collected them from nearly every rabbit he has opened. They occur in the small intestine in large numbers at all seasons of the year and have very much the appearance of small seeds fed to canary birds.

Immediately upon opening a rabbit, these parasites may be seen as small whitish specks, showing through the intestinal wall.

As we have been unable to identify this parasite with any known form of which we have recorded, we believe it represents a new species.

General external appearance.—The parasites are small, more or less elliptical in outline, 0.65–1.2 mm. long by 0.35–0.64

[1] Cooper Curtice—Parasites, being a list of those infesting domesticated animals and Man in the United States; Jour. Comp. Med. and Vet. Arch. 1892, pp. 223-236, vide p. 232.

(0.8 in one pressed preparation) broad by 0.32 mm. thick, appearing nearly round on transverse section. The fresh specimens present three distinct shades (hence the specific name *tricolor*); the portion occupied by the uterus stands out prominently as yellow to brown; the portion occupied by the vitellaria as white, while the remainder of the body appears gray. In old specimens in which the uterus has reached its full development the anterior half of the body is dark-yellow or brown (Plate I, Fig. 2), and it is impossible in these cases to distinguish the internal anatomy or the acetabulum. It is probable that Curtice had specimens of this kind before him when he determined them as "*Monostomum* (?)."

The anterior two-thirds of the body is thickly beset with minute (5 μ long) spines, which, however, frequently fall, and hence are seen on comparatively few specimens. The oral sucker is terminal or sub-terminal, according to contraction, is directed ventrad and measures 88–112 μ in diameter. The acetabulum is situated on about the border of the first and second anterior fourths of the body, 0.32 mm. from the oral sucker; it is slightly smaller than the oral sucker, measuring 72–100 μ in diameter. All of these measurements were made on mounted specimens.

The genital pore is generally about half way between acetabulum and aboral extremity (0.4 mm. posterior of the acetabulum in one specimen); the cirrus on the right, the vulva on the left.

Digestive tract.—The anterior portion of the intestinal tract can be seen best on fresh material. A muscular pharyngeal bulb about 36–40 μ in diameter follows the oral cavity, and is itself followed by an œsophagus, which measures from 30–40 μ in length. The œsophagus then branches into the two crura intestini which take a very irregular course, varying greatly in different specimens, and extend to the posterior extremity of the body (Plate I, Fig. 1).

Male genital organs.—The testicles are never on the same transverse plane; one of them—invariably the right testicle in the thirty or more preparations examined—lies in the median line near the posterior end of the body; the left testicle lies some distance anterior to this, in the lateral portion of the worm, immediately ventrally of the left intestinal sac; the testicles are large, measuring 160 to 272 μ in diameter, and are

round or oval according to the state of contraction of the worm; lobing was not noticed in a single case. The separate vasa deferentia could be distinguished in only one specimen; the common vas deferens, however, was distinctly seen in several specimens; it was median of the left testicle, ran cephalad a short distance, turned and extended caudad across the median line communicating with the ductus ejaculatorius, and in its entire extent (so far as visible) it is occasionally swollen into a seminal reservoir by the presence of numerous spermatozoa. The cirrus-pouch is bottle-shaped, varying somewhat in outline; it measures 160–200 μ long by 80–120 μ wide in its broadest part; the penis is large in proportion to the size of the animal, measuring when fully extruded 80 μ long by 32 μ broad. As stated above, the male opening is post-acetabular, slightly to the right of the median line.

Female genital organs.—The ovary is much smaller than the testicles, round or oval, 80–120 μ in diameter, and is situated on the right of the body immediately ventral of the right intestinal sac; from the dorsal surface of the ovary a small short oviduct (seen only in one specimen, observation therefore needs confirmation) runs toward the middle of the shell-gland and here meets with the vitello-duct, uterus and Laurer's canal, in relations which could not be made out with certainty, either upon sections or in press-preparations. The shell-gland is about one-half to two-thirds as large as the ovary, and is situated slightly nearer the median line. The vitellogene glands are subject to extreme variation. They are located laterally, occupying in some specimens only the middle third of the sides, in other specimens (Plate I, Figs. 1 and 3) extending anteriorly almost to the oral sucker; they may be symmetrically (Plate I, Fig. 3) or asymmetrically developed. The vitello-ducts run caudad, one from each set of vitellogene glands; the left duct crosses the left testicle and the end portion of the uterus ventrally; the right duct crosses the beginning portion of the uterus, and the shell-gland ventrally; the two ducts meet in (Plate I, Fig. 3, Plate II, Fig. 5), or near (Plate I, Fig. 1) the median line at about the upper border of the right testicle, they here form a triangular vitello-reservoir which runs dorsally (Plate II, Fig. 5), the end curving around to the right and apparently entering the shell-gland. Laurer's canal was extremely indistinct; it

could not be seen at all on press-preparations; in two series of transverse sections, however, a delicate string of cells, surrounding a lumen could be followed running dorsally from the shell-gland a short distance; then it was lost to view, but another string of cells with surrounded canal could be distinguished extending from a depression in the dorso-median line a slight distance ventrally, then turning to the right; this imperfectly seen canal is interpreted as Laurer's canal. The uterus begins at the middle of the shell-gland (Plate I, Fig. 1) and runs cephalad in irregular loops on the right-hand side of the worm; it then returns around the left side of the acetabulum and cirrus-pouch, running dorsally of the end portion of the vas deferens, ventrally of the left intestinal sac and dorsally of the left vitello-duct, to the vulva which, as stated above, is situated at the left of the male opening; a striking feature in all specimens examined is that the metatrem[1] always runs as a dark-brown line in a given direction, *i. e.*, from the median line toward the left. This gives us an excellent character by which we can determine with the naked eye dorsal, ventral, right and left, even without hunting for the acetabulum.

Copulation.—The question as to the method of copulation among distomes has given rise to quite a discussion. Without entering into the details of this discussion it may be stated briefly, for information of those who have not followed the question, that three different views[2] in particular in regard to the sexual act among flukes have been supported by various scientists. Some authors believe that the metatrem functions as vagina, and that a cross-fertilization takes place; others support the view that flukes fertilized themselves through the metatrem; still others look upon the Laurer's canal as the true vagina.

It is now quite generally admitted, however, that the Laurer's canal is not used in copulation. Cross-copulation has, according to Braun, been observed by Nitzsch (1819) in *Holostomum serpens*, by Miescher (1838) in *Monostomum faba* Brems., by

[1] H. B. Ward has recently proposed the term *metatrem* for the end portion of the uterus, *i. e.*, for the portion usually named the vagina. (On the Parasites of the Lake Fish. I: Notes on the Structure and Life-History of *Distoma opacum*, n. sp.; Proc. Amer. Micr. Soc., 1894, Vol. XV, pp. 173–182.)

[2] For a detailed account see Braun's Vermes, pp. 745–746, and Looss' Die Distomen unserer Fische and Frösche, 1894, pp. 226–235.

Looss (1885) in *D. davigerum* Rud. ex parte (according to Looss = *D. confusum*), by v. Linstow in *D. cylindraceum* Zed. To this list should now be added the cross-copulation observed by Ward (1894) in *D. opacum*, by Noack in *D. clavigerum*, and the cases (*D. confusum*) mentioned recently by Looss (1894). Self-copulation has, according to Braun, been observed in *D. cirrigerum* v. Baer by Zaddach (1881). To this and to Looss' recent observations (*D. echinatum*) we are now able to add another case. Hassall has this day (XI. 17, 1894) found a large number of specimens of *D. tricolor* in a rabbit, and among these we found four specimens in which self-copulation was taking place. All of the specimens were adult, and the uteri of all three were well filled with ova; the cirrus was extruded from the cirrus-pouch and curved around toward the metatrem like a hunter's horn, the end portion of it entering the metatrem (Pl. II, Fig. 8).

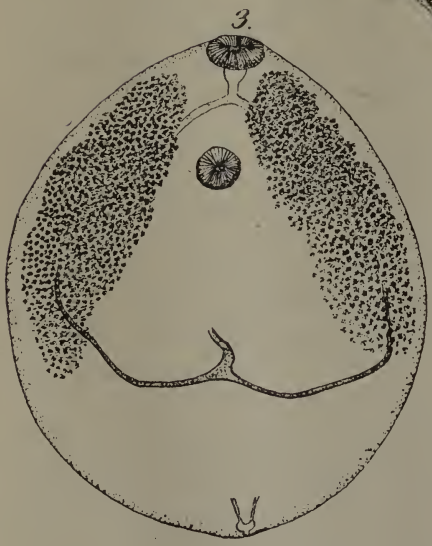
Ova.—The eggs are elliptical and measure 13 μ by 20 μ.

Excretory system.—At the caudal extremity a minute pore may be distinguished, leading into a short canal which immediately branches, giving off to each side a delicate excretory duct; these ducts can be traced but a short distance.

Systematic position.—Some helminthologists lay great stress upon the position of the genital pore as a generic character, and divide the hermaphroditic genus *Distoma* as follows:

1.	Genital orifices between the suckers	2
	Genital orifices anterior or posterior to suckers	3
2.	Oral sucker armed with two protractile tentacles . . . . . *Rhopaloporus* Diesing, 1850	
	Oral sucker without tentacles . . . . . *Distoma* s. st.	
3.	Genital orifices anterior to oral sucker . . . *Cephalogonimus* Poirier, 1885	
	Genital orifices posterior to ventral acetabulum	4
4.	Genital openings *near* the acetabulum . . *Mesogonimus* Monticelli, 1888	
	Genital openings at posterior extremity of the body . . . . . *Urogonimus* Monticelli, 1888	

According to this table *D. tricolor* belongs exactly half-way between the genera *Mesogonimus* and *Urogonimus*, and yet it cannot be placed with either, so that if these two genera are well established (*on a single character*) a new genus would have to be established for *D. tricolor*. As we are exceedingly doubtful as to the present validity of these two genera, we prefer to leave *D. tricolor* in the collective genus *Distoma*.



DISTOMA TRICOLOR.

Fig. 1.—Mounted specimen showinga lmost the entire anatomy; for description, cf. specific diagnos

Fig. 2.—Older specimen in which the uterus has reached an enormous development, hiding many the organs from view.

Fig. 3.—Specimen showing oral sucker, acetabulum, anterior portion of digestive system, vitelloge glands, vitelloducts and end portion of excretory canal.

Fig. 4.—Integument, with spines.

DISTOMA TRICOLOR.

Fig. 5.—Transverse section through genital pore; on the right of the animal are seen ovary and some eggs lying in the beginning portion of the uterus; on the left eggs in the lower portion of the uterus; vitelloducts in the middle of the body; ventrally the cirrus at the right and metatrem at the left.

Fig. 6.—Transverse section slightly nearer the acetabulum; a portion of the left testicle is visible.

Fig. 7.—Transverse section at the acetabulum; the greater part of the body is occupied by the uterus; vitellogene glands at the lateral margins; intestines dorso-median of vitellogene glands.

Fig. 8.—Male organ (cirrus) in copulation with female organ (metatrem) of same animal.

Summary.

1. In this paper we describe a new intestinal fluke from rabbits, for which we propose the following:

Specific diagnosis.—*Distoma tricolor* S. and H., 1895. 0.65–1.2 mm. long by 0.35–0.64 mm. broad, by 0.32 mm. thick; body elliptical; tricolor, uterine portion yellow to brown, vitellogene region white, remainder gray; anterior two-thirds covered with minute instable spines; oral sucker terminal, 88–112 μ in diameter; acetabulum about on boundary of first and second anterior fourths of body, slightly smaller than oral sucker. Pharyngeal bulb about 40 μ in diameter; œsophagus, 30–40 μ long; crura intestini extend to posterior end of body. Genital openings median, half-way between acetabulum and posterior end of body. Testicles large (160–272 μ); right testicle median and posterior; left testicle in middle third of body, ventral of left intestinal sac; vas deferens, cirrus-pouch and penis well developed. Ovary much smaller than testicles, 80–120 μ in diameter, ventral of right intestinal sac; shell-gland between ovary and right testicle; vitellaria latero-ventral in middle third, or anterior two-thirds of body; transverse vitello-ducts between genital openings and right testicle; Laurer's canal present; uterus extends from shell-gland on right side, anteriorly around acetabulum, descending over left testicle or between testicles, then runs from the ventral side of left intestinal sac between testicles, metatrem opening through vulva at left of cirrus-pouch. Ova elliptical 13 μ by 20 μ. Excretory system not well developed; excretory pore terminal, contractile end portion very small, giving off two fine canals.

Hosts.—White Rabbits or Northern Hare (*Lepus Americanus* Erxleben), by Curtice; Gray Rabbit or Cotton-tail (*L. sylvaticus* Bachman), by Hassall.

Geographical Distribution.—Maryland, District of Columbia and Virginia, very common.

Types.—Deposited in United States National Museum; typical specimens in Collection B. A. I., Collection Stiles, Collection Hassall. Typical specimens will be sent to our regular exchanges (Berlin Museum, Wiener Museum, Leuckart, Max Braun, R. Blanchard, Railliet, Moniez, Neumann, Zschokke, Parona, Sonsino, Stossich, H. B. Ward and others). Abundance of material on hand for exchange with others.

This parasite stands midway between the genera *Mesogonimus* and *Urogonimus* as at present diagnosed.

3. We agree with Braun et al. in being extremely sceptical as to the validity of these two genera.

4. Self-copulation was observed in *D. tricolor*.

B. A. I., U. S. Dept. of Agriculture. XI, 24, 1894.

30: Distoma (*Polyorchis*) *molle* (Leidy, 1856) S. & H., 1894.

(Plate III.)

Synonymy.	Bibliography.
1856. *?Monostomum molle*, Leidy .	LEIDY.—A synopsis of Entozoa and some of their ecto-congeners, observed by the author; Proc. Acad. Nat. Sc. (Phila.), vol. VIII, p. 43.
1892. *M. molle*, Leidy	BRANDES.—Revision der Monostomiden; C. f. B. u. P. XII, p. 510.
1894*a*. *D.* (*P.*) *molle*	STILES & HASSALL.—Preliminary Catalogue of Parasites, etc.; Vet. Mag., I, pp. 251 and 253.
1894*b*. *D.* (*P.*) *molle seu Polyorchis molle*	S. & H.=Notes on Parasites, 21; Vet. Mag., I, p. 414.

In 1856 Leidy described a new parasite a follows:

"*?Monostomum molle*, Leidy.—Body depressed, elongated elliptically, posteriorly convex. Head? mouth? Length 9 lines, breadth 2 lines. I have found two specimens of what I suspect to be a species of *Monostomum*, in the lungs of two individuals of *Sternotherus odoratus*. The species is so soft that in the removal of the specimens I mutilated both, and since then I have been unable to find others."

Brandes (1892) was unwilling to express himself definitely as to the nature of this parasite, on account of the meagreness of Leidy's description.

When Leidy's collection came into Stiles' possession, the two specimens mentioned by Leidy were found. They are in very poor condition and do not allow a careful study. Enough could be made out of them, however, to warrant our changing (1894 *a* and *b*) the position of the species to the subgenus [1] *Polyorchis* of the genus *Distoma*.

[1] In the footnote (1894 *b*, p. 414) we were lead into the error of stating that Stossich had raised his subgenus *Polyorchis* to generic rank. This was based upon a misinterpretation of a statement by another author in referring to one of Stossich's papers. So far as we can find in Stossich's papers he has not attempted to raise *Polyorchis* above the rank of a subgenus.

While not in a position to give a full account of the anatomy of this form, we have been able to make out definitely certain points of interest on Leidy's material, poorly preserved as it is.

The worm measures 5.25 mm. long by 1.5 mm. broad; its surface between the suckers is covered with numerous minute spines, regularly arranged (Pl. III., Fig. 2); the spines nearest the mouth are smaller than those nearer the acetabulum. The oral sucker is sub-terminal, 0.32 mm. in diameter. The acetabulum is about on the border of the first and second fourths of the body, about 0.88 mm. from the mouth. Genital pore could not be determined definitely, but as we saw a line of ova on the left of the acetabulum and an indistinct line on the right, we mistrust, from a comparison with Stossich's figure (Pl. III., Fig. 3) of *Distoma polyorchis*, that the genital pore will be found immediately in front of the acetabulum and that the indistinct line on the right of the acetabulum represents the cirrus.

Of the digestive tract but little could be make out with certainty. A pharynx 0.24 mm. long was traced from the oral sucker; then came a very short pharyngeal bulb, 0.176 mm. in diameter; from here an œsophagus 0.88 mm. long was seen to extend caudad, and then branch into a right and left intestine each of which branched again, sending one branch cephalad the other caudad. Of the male genital organs we could distinguish with certainty two longitudinal rows of testicles. In 1894 *b*, we stated that there were thirteen in each row, but in this we were in error. We can now distinguish with certainty fourteen testicles on the right side and fifteen on the left at the posterior end of the right series is a slightly dark portion of tissue, which may possibly represent a fifteenth testicle for the right side, but the material is too poor to determine this with certainty. Cephalad to the testicles as described (14: 15) there is seen on the right side and extending partly over to the left side a very indistinct organ (vitello-reservoir or ovary?), and partly covered by this on the left side an indistinct organ about the size of a testicle (shell-gland? ovary? or testicle?). Between the two longitudinal rows of testicles a fine canal (vas deferens? or more probably excretory canal) was seen. Of the female organs the vitellogene glands were very distinct; they begin at the height of the acetabulum, and run as two broad bands lateral of the rows of testicles to the

posterior end of the body ; the right longitudinal vitello-duct is here and there visible ; and a left transverse vitello-duct could be indistinctly made out. No organs could be definitely established as ovary, shell-gland, or vitello-reservoir. The walls of the uterus could not be distinguished, but the ova formed an index to its position ; extending from the uncertain organ in front of the testicles to the acetabulum, these ova were arranged for the most part irregularly, but here and there transversely in a single regular row ; they also extended (probably in the metatrem) around the left side of the acetabulum to a point immediately to the right of the median line.

Under ordinary circumstances we feel that an author would be totally unjustified in publishing as poor material as we have taken as the basis of this description ; however, as the material represents type-material of considerable theoretical importance, on account of its relation to Stossich's interesting form, we will perhaps be pardoned for bringing the specimens to the attention of other helminthologists.

The question at to the rights of *Polyorchis* to generic or subgeneric rank naturally arises. That the characters found in *D.* (*P.*) *polyorchis* and *D.* (*P.*) *molle* give these two forms subgeneric rank at least, can hardly be questioned. To give the forms generic rank is something of a temptation, and not wholly unjustified ; at the same time we would call attention to the fact that there is still considerable to learn in regard to the anatomical structure of these forms—the ovary of neither form, for instance, has been definitely made out. Thus while we should not be surprised to see *Polyorchis* eventually recognized as a well-established genus, we prefer at present to look upon it as a sub-genus.

We cannot, however, agree with Monticelli (1893) in placing such forms as *D. Richardii* and *D. cygnoides* in this subgenus, as these two species present an entirely different topography from *D. polyorchis* (the generic type). In regard to *D. formosum* Sonsino, 1890, we reserve opinion as we are not acquainted with the form or with any figure of it.

Summary.

1. Leidy's *Monostomum molle* is a distome and is closely related to Stossich's *Distoma polyorchis*.

2. For Leidy's form we propose the following provisional

Specific diagnosis : Distoma (*Polyorchis*) *molle* (Leidy, 1856), S. & H., 1894. Body 5.25 mm. long by 1.5 mm. broad, from oral sucker to acetabulum covered with instable spines. Oral sucker sub-terminal, 0.32 mm. in diameter. Acetabulum 0.3 mm. in diameter, on border of first and second fourths of body 1.3 mm. from anterior extremity. Genital pore probably im mediately anterior to acetabulum. Excretary pore? *Male gen italia*: testicles in two longitudinal rows, 14 (or 15?) on th right, 15 (or 16?) on the left; a fine longitudinal canal (excre tory canal? or vas deferens?) between the two rows of testicles end portion of male canal probably passes cephalad on th right of the acetabulum. *Female genitalia :* vitellogene gland broad, extending from the height of the acetabulum caudad in the lateral fields to posterior end of body; ovary?, shell gland?, uterus confined to a small area immediately posterio to acetabulum, metatrem passing to the left of the acetabulum Ova 48 μ.

Host.—Lungs of Musk-turtle or Stink-pot (*Aromochely odorata* Latreille, [*Sternotherus odoratus*]), by Leidy.

Geographical Distribution.— ——? —— in U. S. A.

Types.—One specimen in Coll. Leidy, University of Pennsyl vania; one in United States National Museum. Both type poorly preserved. None for exchange.

3. This form agrees with *D.* (*P.*) *polyorchis* Stossich from th intestine of a fish (*Corvina nigra*) in the following characters

Body covered with spines from oral sucker to acetabulum genital pore immediately anterior to acetabulum; pharyn and pharyngeal bulb present; intestine with anterior pro longations; testicles post-acetabular and arranged in tw longitudinal rows; end portion of male canal at the right c acetabulum; metatrem runs left of acetabulum; vitellogen glands lateral, broad, extend from acetabulum to posterior end

4. The difference between the two forms may be seen in th following table:

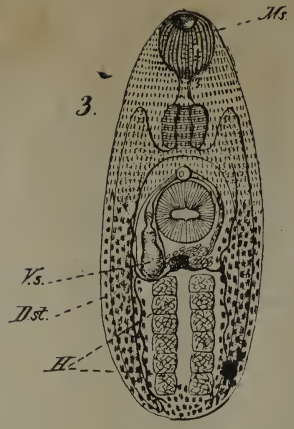
Host, a fish; acetabulum on border of second and third fourths of body; œsophagus absent; testicles symmetrical, six pairs (or [1] twelve pairs?); body 3.5–6.5 mm. long . . . . . *D. polyorchi*

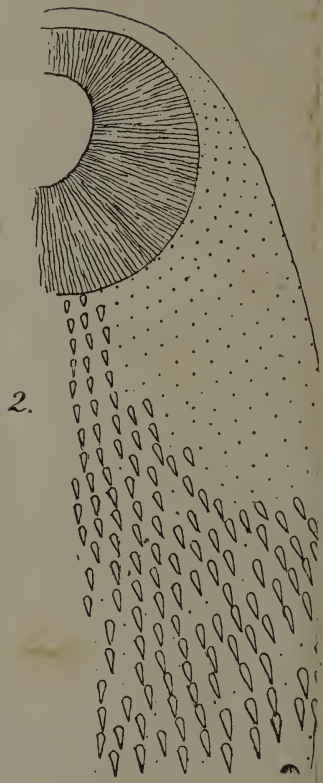
[1] According to Stossich's figure (Plate XIV, Fig. 61), which has been copied by Braun, a which we reproduce on Plate III, there are twelve testicles present; according to his te (Brani di elmintologia tergestina; Bol. Soc. Adriat. di Sc. nat., xv, 1889, p. 24), on the other ha here are twenty-four testicles present.

Host, a turtle; acetabulum on border of first and second fourths of body; œsophagus present; testicles slightly symmetrical, 14½ ? or 15 ? pairs; body 5.25 mm. long . . . . . *D. molle.*

5. *Polyorchis* is certainly entitled to sub-generic rank, and possibly also to generic rank.

6. Before *Polyorchis* is admitted to generic rank, however, several important anatomical details should be made clearer.





DISTOMA (POLYORCHIS) MOLLE AND DISTOMA (POLYORCHIS) POLYORCHIS.

Fig. 1.—*D.* (*P.*) *molle*; drawing from Leidy's type of *Monostomum molle*. For description
[illegible] specific diagnosis, p. 740.

Fig. 2.—Highly magnified anterior portion of same, showing oral sucker, and spines.

Fig. 3.—*D.* (*P.*) *polyorchis* after Stossich. V. s., vesicula seminalis; D. st., vitellogene g
H., testicles. Reduced.

THE VALUE OF PROPHYLACTIC TREATMENT IN ANTHRAX.

By John Faust, V. S.,
Poughkeepsie, N. Y.

For twenty-nine years, to my personal knowledge, splenic apoplexia and splenic fever have occurred every year up to 1886, in a streak of swampy land about two miles long, and Mr. Noxon, one of the sufferers, says he lost $30,000 worth of cattle in that period. All imaginable diseases were suspected by professionals and non-professionals. I held post-mortems year after year, and always found one and the same thing—splenic fever (apoplexia).

In the year 1885, the suspicion of poisoning was so strong that Mr. Noxon wanted a chemical analysis made of the stomach. As I knew that would be money spent for nothing, I proposed that Professor Liautard make a post-mortem examination. After the post-mortem, he stated to the owner that the whole cause was splenic fever.

A great many medicines were used with no effect. I advocated to the owners the vaccination with anthrax virus. I even went so far as to offer to do it for nothing should it be a failure.

The following is a history of the different herds that came under my care in 1886:

On July 3, was called to a cow belonging to Mr. Hoppe. She died before I reached her. The second cow was found dead in the lot. On July 10, was called to the third cow and put her under treatment for splenic fever (my record does not show what treatment). In twelve hours, to all appearances, she was well, but in ten hours more she died and post-mortem examination proved it to be splenic fever. The spleen weighed eight and one-half pounds.

Mr. Hoppe's neighbor also lost his only cow. They were the only cows these men owned.

On July 17, I was called to Mr. E. Lyons' farm. Ten days previous to my call he lost one Jersey cow. On July 16, the second cow was taken sick, to which Dr. Thompson was called, and diagnosed it as dysentery. The cow died shortly after he

left. On July 17, two more cows died without warning or medical care. The same day I found nine sick cows. My diagnosis was splenic fever. I was not prepared for any treatment that night. On the 18th, I made a post-mortem on cows that died on the 17th and found them to have had typical cases of splenic fever. I then separated the sick from the well.

The following are the symptoms and treatment of this herd:

RECORD.

July 18, 10.30 A. M., No. 1, Temperature 107, very restless all night.
" " " 2, " 108.
" " " 3, " 106.
" " " 4, " 103½, restless, died at 5 P. M.
" " " 5, " 107½.
" " " 6, " 101¾, sinking, died at 7 P. M.
" " " 7, " 105¾, breathing very hard.
" " " 8, " 108.
" " " 9, " 104½.

The treatment in all these cases was fld. ext. eucalyptus glob., ½ ounce doses, and arsenicum album, (1–100) 2 drachm doses, alternating every two hours.

July 19, 10.30 A. M., No. 1, Temperature 104¾, restless all night.
" " " 2, " 106½.
" " " 3, " 103.
" " " 5, " 106⅓.
" " " 7, " 102, breathing almost normal.
" " " 8, " 105.
" " " 9, " 101⅓.

The same treatment continued, they all ate, drank and ruminated some.

July 20, 12 M., No. 1, Temperature 101, very little restlessness.
" " " 2, " 102½, very drowsy and stiff.
" " " 3, " 101.
" " " 5, " 102⅓.
" " " 7, " 101¼, breathing normal.
" " " 8, " 100¾.
" " " 9, " 101.

Continued same treatment every three hours.

July 21, 3.30 p. m. Temperature of all the cows was normal. They all eat and drink well and have a fair flow of milk. No medicine.

On July 25, I inoculated nine cows and one calf with Chauveau's virus, received from Professor Liautard. The following is the method of vaccination.

Clip the hair on inside of thin part of the ear. Make a small incision with a sharp pointed bistoury. Clean off the small quantity of blood and inject with hypodermic syringe two drops of the virus.

On July 26, cow No. 3 had a very alarming high temperature: at 11.30 a. m., temperature 107, and at 7 p. m., temperature 108. All the rest of the cows had a slight rise in temperature. On July 27, cow No. 3's temperature was 102½, and to all appearances well.

The ears of all the cows, where the inoculation was made, swelled to more or less extent.

The following is a history of the herd of cows owned by the Hudson River State Hospital. On the twenty-seventh of March, 1887, I was called to make a post-mortem examination on a young cow which had died the night previous. Results: On removing skin, the tissues appeared to be filled with dark hemorrhagic spots, the spleen very much enlarged, and of a very dark color; the abdomen contained a quantity of dark serum; the kidneys were dark and ecchymosed. The statement was made by Dr. Cleveland that they had lost from ten to twelve head every year at different periods, in the same manner for a number of years.

I proposed the vaccination of the entire herd with Chauveau's virus, to which the doctors of the hospital agreed, and on the thirty-first day of March, I vaccinated the entire herd of forty-four head.

Of these vaccinated, two died after a lapse of four years and four months of splenic apoplexia, fortunately in a place where no cattle have been kept since.

I also vaccinated the herd of Mrs. Wiley, consisting of twenty-three head and Mr. J. Rose's herd of sixteen head. There was no table of temperatures kept of these two herds.

Since 1887, there have been but two cases of splenic apoplexia (the two of the Hudson River State Hospital) in the whole district.

Every year for over thirty years this disease has claimed its victims. This is certainly very gratifying for the use prophylactic treatment of this disease.

The following is the table of temperatures after vaccination :

	Temperature before Injection.	Temperature after Injection.				
	March 31.	April 1.	April 2.	April 3.	April 4.	April 5.
1	102	102	103	102	101½	101
2	100	102¼	102	101½	102	100¾
3	100	101½	103¼	102	101½	101
4	100½	101	102	102	101	100½
5	100½	105½	104	103	102½	100
6	100¾	102¼	103	104½	102½	101
7	100	102	102¾	104½	105	101¾
8	100	101	101	101	102	101
9	100	101	102½	101½	101	101
10	100	101¼	102½	102	100¾	100
11	99½	100¾	102	101¼	101	101
12	100	101½	103¼	103½	102	101½
13	100½	102	102	101¼	101¼	101
14	100	100¾	102	101	101	100½
15	100¼	102¼	104	103	101½	101
16	101	102	102½	101	101	101½
17	100½	102	104	100¾	100¼	100
18	100¾	102	104¾	101¼	101	101
19	100	101¾	105	107	104½	101[1]
20	101	102	102¼	101¼	99¾	100
21	100	101¾	102½	100¼	100¾	100
22	101	103	104	103	101	101
23	100¼	102	102½	99½	100½[2]	100
24	100	100¼	102	99¼	105	101
25	100	102½	103	100¼	100	100½
26	100½	102¼	103	101¼	100½	100
27	101	103¾	103¼	103	100¼	101
28	100½	101	102	101¼	101	101
29	99¼	101½	102	100	101	100½
30	100	101	102	101½	99½	100
31	100	101½	102	101¼	101¼	101
32	100½	102¼	102	100	101	100½
33	100	103¾	102	103	102½	100¾
34	101½	103	100¾	102	103	101
35	100¼	102¾	102	101	100	100¼
36	100	102½	103	100½	100½	100½
37	100¾	103	102	101	100	100½
38	101	102½	104	102½	101	100
39	101¼	103	102½	101	101½	101
40	100½	103	101¾	100	101	100½
41	101½	104	102	101	100½	100¾
42	101	103	102½	101¾	100¾	101
43	100	103½	105	103	101½	100¼
44	100½	102	104	102	100¾	100½

[1] Ear swelled very bad.

[2] Chill.

INTRODUCTORY LECTURE TO THE TWELFTH ANNUAL SESSION OF THE CHICAGO VETERINARY COLLEGE.

By E. L. Quitman, M. D. C.,
Professor of Materia Medica.

Gentlemen:—It is with much pleasure that I welcome you to the Chicago Veterinary College at its twelfth opening exercises. I am pleased to see so many of you have the courage and enterprise to attempt to enter one of the highest and noblest professions—a profession which has been dragged from the depths of quackery and ignorance and placed on a level with that of our sister profession, human medicine. Our domesticated animals are subject to nearly, if not all, the diseases of the human being, and require the same skill in diagnosis and treatment as does man himself.

It is true that in comparison with the number of so-called veterinarians (quacks) who tend to lower the veterinary profession, the reputable members of the profession constitute so small a minority that they are often unable to secure the legislation necessary to exclude these empirics; whereas the physician is now protected in nearly every State of the Union by laws of his own framing. Gradually, however, the States are falling into line and enacting laws for the regulation of veterinary practice, and when this has been done to the same extent as in human medicine, then truly the veterinarian will be on a par with the physician, because our schools are fast reaching a degree of perfection which will give the veterinary student advantages equal to those enjoyed by the student of human medicine. Even now, for every ignorant veterinarian, I can point you out an ignorant physician—quacks not included. I mention these facts to show the faith I have in your chosen profession. I do not acknowledge the physician to be of higher rank than the veterinarian.

The term *Veterinary* is derived from the Latin, *Veterina*, beasts of burden. This term is now used in such a broad sense that veterinary medicine and surgery embrace the medical and surgical management of all the domestic animals.

Veterinary science comprises a knowledge of the conformation and structure of all the domesticated animals, their physiology and racial and individual characteristics, their humane management in health and disease, their utilization, their protection from, and medical and surgical treatment in, the diseases and injuries to which they are exposed ; their amelioration and improvement, their relations to the human family with regard to communicable diseases, and the supply of food and their products for human consumption.

There is evidence that the Egyptians practiced veterinary medicine and surgery in very remote times, but only from the Grecians do we obtain any very definite information as to the state of veterinary and human medicine in ancient times. The writings of Hippocrates, the father of medicine, (460 to 356 B. C.), afford evidences of excellent investigations in comparative pathology. Aristotle wrote on physiology and comparative anatomy, and on the maladies of animals, while many other Greek writers on veterinary medicine are cited by Varro, Columella, Galen.

Until after the conquest of Greece, the Romans do not appear to have known much of veterinary medicine. Varro (116 to 28 B. C.) may be considered the first Roman writer who deals with animal medicine in a scientific spirit. His "De Re Rustica," in three volumes, is largely derived from Greek writers. Celsus is supposed to have written on animal medicine. From the third century onwards veterinary science had a literature of its own, and regular practitioners, especially in the service of the Roman army. Perhaps the most renowned veterinarian of the Roman Empire was Apsyrtus of Bithynia, who in 322 A. D. accompanied the expedition of Constantine against the Sarmatians, in his professional capacity, and seems to have enjoyed a high and well-deserved reputation.

Toward the close of the modern period veterinary medicine was much cultivated in the cavalry schools of Italy, and Spain also, in the fifteenth century, had an organized system of good practitioners, who have left many books, still extant. Germany was far behind and produced no literature until the end of the fifteenth century. In the sixteenth century the influence of the Italian writers became manifest, and the works of Fugger and Fayser marked the commencement of a new era. In Great Britain veterinary medicine was perhaps in a more

advanced state than in Germany, yet it was largely made up of the grossest superstitions. Among the Celts, as among the other civilized nations of Europe, the healer of horse disease and the shoer were held in high esteem, and the court farrier enjoyed special privileges.

The earliest known work in English appeared anonymously toward the commencement of the sixteenth century, namely, "Propertees and medcynes for a horse and mascal of oxen, horses, sheepes, hogges, dogges."

English books of the seventeenth century show a strong tendency toward improvement in veterinary medicine and surgery, especially as regards the horse. This improvement is more notable in the literature of the eighteenth century. Veterinary anatomy was greatly advanced by the "Anatomy of an Horse," (1683) of Snape, farrier to Charles II., illustrated with copper plates, and by the still more complete and original work of Stubbs, "The Anatomy of the Horse" (1766). This latter work marked a new era in veterinary anatomy.

The most important era in the history of modern veterinary science began with the establishment of veterinary schools. France took the initiative step. Bourgelat, through influence with Louis XV., induced the government to establish a veterinary school at Lyons in 1761. He directed it himself for a few years, when he realized that the great benefits from it justified an extension of its teachings to other parts of France. Therefore, at Alfort, near Paris, in 1766, he founded a second veterinary school, which soon became and remains to this day one of the finest and best veterinary schools in the world.

Soon after the Alfort school was established, the National School for Austria was founded at Vienna by order of Maria Theresa, and this school, remodeled and reorganized by Joseph II., is now the largest in the country. Prussia quickly followed suit, and government schools were founded in almost every European country excepting Great Britain. In 1790, St. Bel, after studying at the Lyons school and teaching both at Alfort and Lyons, went to England and established "the Veterinary College of London," which has been the parent of other veterinary schools in Great Britain. The first veterinary school in Scotland was founded by Professor Dick, a student of Coleman's, and a man of great perseverance and ability. In 1844 the Royal College of Veterinary Surgeons (not the Royal Veterinary

College) obtained its charter of incorporation, its purpose being to examine students taught in the veterinary schools and to bestow diplomas of membership on those who successfully passed the required examinations.

The first college to be founded in the United States was the Columbia Veterinary College (now defunct) in 1857 in New York City. We have now in North America a large number of colleges, quite a few of them I am sorry to say of the mushroom variety. Several of the universities have established departments of veterinary medicine.

The veterinary literature of this period affords striking evidence of the progress of the science: excellent text-books, manuals and treatises on every subject belonging to veterinary medicine are numerous, and there is an abundance of periodical literature. The practical and technical education of practitioners has, of course, been improving to a corresponding extent.

Veterinary medicine has been far less exposed to the vagaries of theoretical doctrines and systems than human medicine. The explanation may perhaps be that the successful practice of this branch of medicine depends upon the careful observation of facts and the rational deductions therefrom to a greater extent than does human medicine. It is a medical eclecticism, based on practical experience and anatomico-pathological investigation, rarely, indeed, on philosophical or abstract theories. In this way veterinary science has become preëminently a science of observation. At times it has been slightly influenced by the doctrines which have influenced human medicine, such as those of Broussais, Rademacher, Hahnemann and others, but not for long. Experience of them when tested upon dumb, unimaginative animals soon exposed their fallacies and compelled their discontinuance.

Of more importance than the cure of disease is its prevention, and this is now considered the most important object in connection with veterinary science. More especially is this the case with those serious disorders which depend for their existence upon the presence of an infecting agent, and which are communicable to man.

Every advance made in human medicine affects the progress of veterinary medicine, and recent discoveries must in the end create as great a revolution in veterinary practice as in human medicine. In preventive medicine the application of the germ

theory is of much importance. The sanitary police measures, based on this knowledge, are easily framed, and if carried rigorously into operation, must eventually lead to the extinction of these disastrous disorders.

The medicine of the lower animals differs from that of man in no particular, except, perhaps, in the application of utilitarian principles. The life of man is sacred, but where there are doubts as to the possible restoration to health and soundness of an animal, monetary considerations generally decide against the adoption of remedial measures.

The Chicago Veterinary College.

This school was organized in 1883 by Professors A. H. Baker, R. J. Withers, and Joseph Hughes. The new veterinary school had neither pecuniary endowment nor public support. The three gentlemen had neither wealth in hand nor wealthy relatives but, nevertheless, did have two necessary elements of success, namely, faith and an abundant capacity for work, and so successfully did they use these elements that at the end of two years they found the space in the rickety old livery stable, with the dissecting room across the alley in a little, old barn, inadequate for their purpose. Consequently, this building was planned and built, and even here by reason of the phenomenal growth in the attendance, important changes have been necessary from time to time for the acommodation, comfort and welfare of the students, and to-day the school is one of the best equipped on the continent. The course is as scientific as is consistent with thoroughly practical instruction. There are abundant facilities for the teaching of theory and practice of veterinary medicine, anatomy, chemistry, a well-equipped medical laboratory—the pride of Professor Ellingwood. Veterinary dentistry, both theoretical and practical, helminthology, general pathology, histology, the use of the microscope, materia medica, pharmacy, hygiene, breeding and general management of domesticated animals receive careful and thorough attention. Special attention is also paid to veterinary surgery and obstetrics, lameness, shoeing and examination of horses for soundness.

The founders of the Chicago Veterinary College can look with pride upon the successful career of their graduates, some of whom are employed as teachers of veterinary science, a large number holding important government positions, and

nearly all enjoying lucrative practices. It is to the success of its graduates that the success of the college is due, and I am constrained to say to you that the reputation that it is to have in the future will depend on the fidelity with which each one of you shall perform the duties of the positions you will occupy.

You, young men, in choosing the profession of medicine, have entered upon a field of study of wider scope, of more intense interest, and capable of yielding fruits of greater benefit both to yourselves and to your race, let alone the poor suffering dumb brute, than any other known to us. Regarding the extent of the field of study you have entered upon, it may truthfully be said that it extends to and includes some part of every science known to man. For while man himself stands as the central figure in this vast field, his anatomy and physiology finds analogies and illustrations in every class, order or species of animal.

The present era in medicine, by which I mean the last half of the nineteenth century, is pre-eminently one of brilliant discoveries and inventions, of rapid and extreme fluctuations in opinions and practice. These characteristics are the natural results of the transition from centuries of purely theoretical groping in darkness, to the rapid unfolding of actual knowledge concerning the composition and properties of the material world we inhabit, in the progress of modern chemistry and physics, in actual knowledge of the structure and function of various parts of the body, and the influence of exterior agents upon them. The germ theory of disease is a modern innovation, and a most important one, especially in preventive medicine. The present status of medicine has an actual scientific basis for each of its branches, accompanied by all the instruments and methods necessary for further reliable investigations, and the great necessity now is, not new instruments, new remedies or new specialties, but the patient application of our ample methods of investigations to the detection and elimination of existing errors, and to the verification of all practical deductions by actual tests either in the laboratory or in the clinic room.

For example, it is not enough that you know a microbe or a ptomaine may produce a certain disease; you should be able to follow the germ from its point of entrance into the system to its exit or destruction. It is not sufficient that you know

the symptoms of a disease; you should be able to see clearly the actual morbid process which takes place through all the different phases of that disease. Neither is it enough that you should know that one remedial agent may act as a cathartic, another as a diuretic, and another as an antipyretic, but you should know whether the first produces its effects by increasing secretion from the mucous membrane, or by inciting increased action of the nervous and muscular structures of the intestines; whether the second increases the flow of urine chiefly by increased activity of the renal cells, by greater dilution of the blood, or by nervous excitation; and whether the third reduces the temperature by retarding the process of heat production, or by increasing heat dissipation, or by depression of the heat centres of the brain. The great practical importance of an exact knowledge of etiology, pathology, and therapeutics is too obvious to every intelligent student to need further illustration. It should be the aim of every student and practitioner of the healing art to know the actual changes in the blood, the tissues, the secretions and excretions, and the function of each organ, from the beginning to the end of every morbid process. It should be equally his aim to know the exact composition, properties and actions of every remedial agent he uses, and its influence on any one or all of the structures and functions of the living body. The present facilities and appliances for exact research, if used intelligently and patiently, make the evolution of such completeness of knowledge possible in every department of medicine.

In proportion in which you see clearly the important lines of study I have indicated and steadfastly follow them, in the same proportion will all the departments of veterinary medicine increase their claims to the position of true sciences, and its standard will be raised at least to that of the human medical profession. Yours is a noble calling with plenty of room at the top.

ABSTRACTS.

TRIORCHIDISM IN THE HORSE.

M. Mauri, in his studies "Upon the Influence of the Testicles and the Ovaries upon the Sexual Instincts," mentions an observation by M. Bernardat of triorchidism. The subject, a foal, was castrated and two testicles removed. The animal immediately manifested the sexual instincts. After some months a tumor appeared in the region of scrotum and three months after the first castration M. Bernardat removed a third testicle, soft, and ovoid in shape. From this time on the sexual instincts disappeared.—*Rev. Vét.*

TREATMENT OF UMBILICAL AND VENTRAL HERNIA.

M. Degive recommends the following treatment:

The animal is placed upon the back and the region washed and disinfected. Two needles are passed through the skin and the lips of hernial opening, being careful to push hernied intestine and its sac into the abdominal cavity with the fingers. The hernia clamp is then applied and its two branches closed to within about eight millimetres (⅓ of an inch). The needles are withdrawn, and in order to prevent the slipping off of the clamp, six horse shoe nails are passed through the sac above the latter.—*Rev. Vét.*

CASTRATION BY LIGATURE.

M. Cagny, combining the method of Jacoulet and that of Moussu and Pellerin, has performed this operation upon a thoroughbred horse in the following manner:

A cord was tied around the scrotum above the testicles to keep these organs in the bottom of the scrotal sacs. A single

incision was made in the median line, both glands drawn out, and the two testicular cords twisted, one upon the other in the manner of twisting two strings upon each other. A catgut ligature was applied upon the twisted cords which were cut below the point of ligation, the stump pushed into the scrotum and the integument sutured.

This procedure has been successfully employed upon a boar, two dogs and five pigs.—*Rev. Vét.*

NOTES ON PARASITES.

Dr. M. Francis mentions forty-six species of parasites, which he has found in Texas. The list is quite valuable as establishing the presence of these forms in that State, but care must be taken in using the specific names which he gives, for evidently, through the gross carelessness of the printer, the entire article is full of typographical errors, of the forty-six species mentioned, fifteen being incorrectly spelled. The author has endeavored to correct these mistakes in an *Errata*. It certainly does seem a pity that, no matter how careful the authors are, the printers will so persistently endeavor to turn scientific terms up-side-down and wrong-side-out, until it is frequently difficult to understand what animal the author has under observation.

The *Distoma* (sp.?) described (p. 450) from the intestines of opossum, is evidently *Rhopaloporus coronatus* (Rud., 1819, nec. Wagner, 1852), Diesing, 1850. (Stiles.)—Dr. M. Francis, *Bulletin* No. 20, Texas Agricultural Experimental Station, pp. 450–452.

STRINGHALT.

M. Comény, veterinarian to the first dragoons, is of the opinion that the peculiar movements in the so-called stringhalt are due to a dryness of the articulation of the hock; to a diminution in the secretion of the synovia of the joint primarily, and afterwards, probably also in the tarsal sheath.

"This peculiar condition can be felt by the touch. The skin is closely adherent to the external surface of the tarsal bones,

is movable only with difficulty, and can not be readily picked up in a fold; the fluctuation in the internal saphena vein is diminished; besides, in the hollow of the hock, both in the inner and the outer sides, the two layers of the skin are separated only by such a thin layer of tissue that these two portions of the integument in severe cases appear to be almost in direct contact with each other.

"This absence of synovia is certainly the cause of the rays (linear abrasions) on the articular surfaces, seen by several veterinarians, which have been considered as a cause, but are only an effect." He claims to have found this dryness of the hock in all cases, several hundred, of stringhalt which he has examined since 1876, and that they are marked according to the severity of the altered locomotion. He does not claim this fact as the invariable cause in all cases, but in all those which he has observed.

"In stringhalt, slight as it may be, this defective movement is always exaggerated when there is temporary cause of pain in another part of the member. Thus, in an ordinary case, with only moderate abnormal movements of the metatarsus, if there be a fissure of the pastern or a quittor in the member, the movements become very much exaggerated. It is this which has given rise to stringhalt of a temporary nature in certain horses.

"The abnormal movement disappears with exercise because of the increased synovial secretion from the exertion. On the contrary, rest, by decreasing the quantity of synovia, renders visible these movements, which otherwise had not been perceived."

The author has applied various forms of local treatment, but without any good results. He attributes the primary lesion of the symptoms, that is of the hyposecretion of the synovial fluid, to an alteration in the spinal cord, the principal support of the theory being the evidences of pain which the animal shows when manipulated over the lumbar region with the hand. He mentions no examinations of the spinal cord itself.

As an experimental proof of the correctness of this synovial theory, the author suggests an injection of the white of an egg into the cavity of the articulation.—*Rec. de Méd. Vét.*

[There are cases of this defective muscular movement which cannot be placed in the above category. Ed.]

THE PULSE IN THE DOMESTIC ANIMALS.

The following extract is taken from the *Recueil de Médecine Vétérinaire*, November, 1894, as part of a review of the "Recherches de physiologie comparée sur la fréquence du pouls à l'etat normal chez les animaux domestiques," by Richard Ellinger, director of the abattoir of Grossenhain, Saxe.

Frequency of the Pulse in the Horse—Influence of the Age.

(*After Hering*).

Age of the Horse.	Pulsation per Minute.
1 to 2 days	100–120
14 days	80–96
3 months	64–76
6 "	64–72
1 year	48–56
2 years	40–48
3 "	38–48
4 "	32–40

(*After Dickerhoff*).

1 to 3 months	48–58
3 to 7 "	45–48
8 to 12 "	40–42

Frequency of Pulse in Cattle.

(*After Hering*).

Age.	Pulsation per Minute.
1 to 2 days	92–132
4 to 5 "	100–120
14 days	68
4 to 6 weeks	64
6 months to 1 year	56–68
1 year to 2 years	64
4 years (male)	56

(*After Furstenbern—Leisering.*)

New born	120–130	
3 to 10 days	100	
3 to 4 weeks to 2 years	70–80	
After 2 years	58–62	(minimum 50.)

INFLUENCE OF THE TIME OF THE DAY—WELL-BRED HORSES.

(*After Noack.*)

	Per Minute.	
Morning	27.91	Mean of a large number of observations.
Noon	28.93	
Night	28.66	

GELDINGS IN THE ROYAL STABLE OF DRESDEN.

	Per Minute.
Morning	32.94
Noon	33.69

MARES (DITTO).

	Per Minute.
Morning	33.36
Noon	32.93
Night	33.33

COMMON HORSES.

(*Geldings.*)

	Per Minute.
Morning	38.44
Noon	38.30
Night	39.96

(*Mares.*)

	Per Minute.
Morning	40.44
Noon	38.63
Night	41.78

ADULT ANIMALS—MEAN FIGURES FROM VARIOUS AUTHORS.

(*A.—Horse.*)

Pulsations per Minute.	
34–36	Alb. v. Halier.
32–40	Hering.
34	Link.
36	Burdach.
40–45	Erdelyi.
35–40	Guret.
26–30	Franz Müller, Vienna.
23–40	Weiss
35–40	Thanhoffer.
24–40	Schmidt-Mülheim.
40	Brückmuller-Polansky.
25–40	Munk.
28–32 Thoroughbred 32–40 common.	Schwarznecker.
36–38	Dieckerhoff.

(*A.—Horse.*) Continued.

Pulsations per Minute.	
36–40	Colin.
28–40	Friedberger-Fröhner.
30–40	Wilkens.
28–40	Siedamgrotzky.
23–46	Süssdorf-Ellenberger.

(*B.—Ass.*)

No. of Pulsations.	
46–56	Hering.
45–50	Gurlt.
40–50	Schmidt-Mülheim.
50	Burdach.
46–50	Süssdorf-Ellenberger.
46–50	Colin.

(*C.—Cattle.*)

No. of Pulsations.	
36–38	Alb. v. Haller.
38	Burdach.
35–42–64	Hering.
45–50	Erdelyi.
48–120	Weiss.
35–40	Gurlt.
45–50	Franz Müller.
45	Rychner.
58–62	Fürstenberg-Leisering.
45	Brückmuller-Polansky.
60	Stockfleth.
60	Dieckerhoff.
45–50	Colin.
40–60	Schmidt-Mülheim
60–80	Harms.
40–50	Munk.
68–84	Saake.
40–60	Siedamgrotzky.
40–60	Friedberger-Fröhner.
40–50	Süssdorf-Ellenberger.
30–40	Wickens.

(*D.—Pig, Sheep, Goat.*)

No. of Pulsations.	
60–80	Weiss.
68–80 (sheep)	Hering.
74 (goat) / 75 (sheep)	Burdach.
60–70 (sheep)	Erdelyi.
70–80 (sheep, goat)	Weiss.
70–80 (sheep, goat, pig)	Colin.

(*D.—Pig, Sheep, Goat.*) Continued.

No. of Pulsations.	
60–80	Gurlt.
70 (sheep)	Brückmuller.
80 (pig)	Brückmuller.
60–80	Schmidt-Mülheim.
60–80	Franz Müller.
70 (sheep)	Franz Müller.
70–80	Süssdorf-Ellenberger.
70–80 (sheep, goat)	Siedamgrotzky.
60–80 (pig)	Siedamgrotzky.
70–80 (sheep, goat)	Friedberger-Fröhner.
60–80 (pig)	Friedberger-Fröhner.

(*E.—Dog.*)

No of Pulsations.	
90–100	Hering.
80–100	Erdelyi.
78	Link.
70–120	Weiss.
95	Burdach.
90–100	Gurlt.
70–120	J. Munk.
80–100	Schmidt-Mülheim.
100	Franz Müller.
70–120	Süssdorf-Ellenberger.
70–129	Müller, Dresden.
90–100	Hertwig.
76 (large)	Friedberger-Fröhner.
80–90 (medium)	
100–120 (small)	
90–100	Colin.

(*F.—Cat.*)

No. of Pulsations.	
100	Burdach.
120–140	J. Munk.
120–140	Süssdorf-Ellenberger.
110–130	Friedberger-Fröhner.
120–140	Colin.

In the second part the author describes his own personal observations; the following is a resumé:

(*I.—Horse.*)

Foals.	Pulsations per Minute.
8 to 10 weeks	60–79
6 months	60–71
10 to 12 months	50–68

(*I.—Horse.*) Continued.

Foals.	Pulsations per Minute.
1 year to 1½ years	48–65
2 years	44–65
3 "	39–62
4 "	36–59
Horses.	
5 years	36–57
5 to 10 years wellbred.	27–42
5 to 10 " common.	30–59
10 to 15 " "	30–60
20 to 25 " "	30–60
26 years (thoroughbred)	42–46

INFLUENCE OF THE RACE AND THE SEX.

1.—Draft-horse (Belgian).

Geldings	31–49
Mares	32–50

(*1.—Prussian Coachers.*)

Geldings	29–38
Mares	26–39

INFLUENCE OF THE HOUR OF THE DAY—OBSERVATIONS UPON THREE BELGIAN SADDLE MARES.

		No. 1	No. 2	No. 3.
Morning	6 o'clock	39	36	40
"	7 "	39	35	40
"	8 "	40	38	40
"	9 "	39	34	38
"	10 "	40	36	38
"	11 "	41	38	37
"	12 "	40	38	38
Afternoon	1 "	40	39	38
"	2 "	39	36	37
"	3 "	38	38	39
"	4 "	38	37	40
"	5 "	38	36	39
"	6 "	39	36	38
"	7 "	41	38	40
"	8 "	42	38	41

INFLUENCE OF MUSCULAR WORK.

(*Two Danish Horses.*)

	Pulsations per Minute.
Absolute rest	38–36
After 5 minutes pulling plow	56–52
" 10 " " "	65–69
" 5 " trotting	76–72
" 10 " "	92–106

INFLUENCE OF DIGESTION.

	Pulsations per Minute.
Before feeding	39.5 (mean.)
First hour of digestion	42.5
Second " "	44.94
Third " "	40.5

(*2.—Ass.*)

6 weeks of rest	57–69
Morning, 6 o'clock	59
" 10.30 o'clock	64
Afternoon, 3 o'clock	60
" 4 "	58
" 7 "	66

(*3.—Cattle.*)

Calf at birth	154–175
½ hour after birth	118–148
6 to 12 days after	115–136
2 to 4 days	110–125
8 to 14 hours	105–115
1 month	100–115
2 months	90–110
3 months	90–105
6 months	85–103
1 year	80–98
Adult work ox	36–49
Fattened ox	50–58
Durham cow	78–108
Simmenthal cow	78–96
Work cow	62–77
Swiss cow	66–72
Old work ox, 12 to 14 years	50–58

(*4.—Pig.*)

Young	120–168
12–14 weeks	100–124
Boar (adult)	62–74
Sow	72–96

(*5.—Sheep.*)

Ram (merino)	62–74
Lamb 8 weeks	109–127
Ewe, 1 to 1½ years	56

(*6.—Goat.*)

Female	86.8
Female, advanced gestation	80-99
Male	69–81

(*7.—Dog.*)

	Pulsations per Minute.
Hound (adult)	62–76
Terrier	96–120
Pug	106

(*8.—Cat.*)

Mean . . . . . 125 pulsations per minute.

(*9.—Rabbit.*)

Savage	98–124
Wild	114–144

THERAPEUTIC NOTES.

TRIKRESOL AS AN ANTISEPTIC.

This antiseptic is a clear, colorless liquid, three times as powerful as carbolic acid. It is cheap, makes a clear solution, does not corrode instruments, and neither makes the hands of the operator slippery, like lysol, nor numb, like carbolic acid solutions.—*International Journal of Surgery*, Vol. VII., No. 3.

ARECOLINE AS A SUBSTITUTE FOR PILOCARPINE AND ESERINE.

Fröhner formulates the following conclusions:

1. Arecoline is an active sialagogue in doses of .01 to .05 gram (⅙ to ¾ grains); 2. Like eserine, arecoline is a laxative; its action is equivalent to that of eserine and pilocarpine combined.

It is ten times more active than pilocarpine and equally as active as eserine. Doses of ⅙ to ¾ of a grain act in from fifteen to thirty minutes. (3) The laxative action of arecoline is accompanied by colicky pains; (4) Some subjects show nausea; (5) Large doses produce sweating; (6) Often there is abundant discharge of urine; (7) The discharge of urine is due to the contraction of the walls of the bladder; (8) The heart-beats are accelerated; sometimes they are arhythmical; cardiac paralysis, diminution of the blood pressure and of the temperature; (9) Small doses do not influence the respirations; large doses produce dyspnœa and kill by asphyxia; (10) Toxic doses cause muscular spasms; .25 grams (4 grains) produce epileptiform convulsions; .50 grams (8 grains) kill with tetanic symptoms, like strychnia and nicotine; (11) The therapeutic dose in the horse, given hypodermically, is .01 .05 gram. It is best to commence with .05 gram, and if no action results, the dose can be repeated at the end of an hour; (12) In the ox the maximum dose is .1 gram (1½

grains); (13) Arecoline possesses no myotic action; only when applied locally does it produce myosis; (14) Of the areca nut powdered, the horse can take 200 grams and the ox 500 grams.

The anthelmintic doses are as follows:

Horse	100 grams.
Ox	250 grams.

These doses contain from one to twenty-one grams of arecoline.

Arecoline holds an intermediate position between eserine and pilocarpine; it acts uniformly upon the glandular secretions and the muscular contractions; sometimes the secretory action may predominate.

Fröhner recommends this agent in all affections in which it is desired to produce an evacuation of the intestinal contents and its rapid dilution, such as in cases of intestinal obstruction.

Besides, its sialogogue action recommends the drug in exudative diseases, in rheumatoid inflammation of the foot.

Arecoline is contra-indicated in nervous colic, in the pregnant female, in tetanus and in pharyngitis.

It can also be used in verminous colic.

Another advantage arecoline possesses over eserine is that it can be more easily preserved. Also it is less expensive.—*Jour. de Méd. Vét. et de Zoötech.*

PROCEEDINGS OF SOCIETIES.

PHILADELPHIA VETERINARY MEDICAL SOCIETY.

One of the most interesting and most largely attended meetings of the Philadelphia Society of Veterinary Medicine, was held in the lecture room of the Veterinary Department, University of Pennsylvania, December 13. The session was a practical demonstration of animal intelligence by Professor H. S. McGuire's wonderful pony, "Mazeppa." The meeting was opened with President Dr. Conrow in the chair. Dr. Schreiber at once moved to suspend with all matters of business. This motion was seconded and carried.

Dr. Harger then read a paper on "Some Ethnical Characters of the Head," giving the relative size of the brain and the volume of the cranial cavity in horses of different size and races. The volume of the encephalic mass varies with the size of the animal; being largest in the large draft horse, and smallest in the smaller varieties of horse. On the contrary, in proportion to the size and weight of the horse, the brain in the small horse is larger than that of the larger races.

"Mazeppa," who during the reading of the paper was quietly standing in the centre of the room, is a mare fourteen hands high, nine years old and piebald sorrel. She was raised in Texas among a lot of mustangs, and shows many of the characteristics of the Arabian horse. Her owner and trainer, H. S. McGuire, bought her with a carload of mustangs a little over three years ago, and it was while nursing her through a severe attack of pneumonia that he first noticed her remarkable intelligence.

After introducing her to the audience, which she promptly acknowledged by a polite bow, Mr. McGuire requested her to show the audience the manner in which the answering of questions, counting, addition and subtraction of figures are done, by striking the floor with his hoofs. The time on a watch is given by pawing the hours with one foot and the minutes with the other. Questions requiring an answer "yes" or "no," are indicated by the nodding or shaking of the head.

After asking a few questions himself, such as the number of days in a week, months in a year, etc., the animal was practically turned over to the audience. A question of how much are 5 and 7 immediately brought forth 12 taps of the foot; take 8 from 12, 3 from 9, 3 from 7, were as promptly met with correct result. When, however, one of the students called out to take 4 from 3, a decided shake of the head in the negative was the answer. The time on some fifteen watches, some of which had purposely been set back or forward, was invariably told correctly; only once did she fail in this. When one of the members presented his watch, after giving a glance at the watch, she shook her head vigorously in the negative. It was a calendar watch with several dials.

Five columns of figures with six figures in each, called out haphazard from the audience, were correctly added with surprising rapidity, the number to be put down and the number to be carried being pawed first with the right and then with

the left foot. The number of persons on the first row was then correctly counted. The different ages of at least a dozen persons were correctly pawed after telling the animal the year of birth. The most astonishing and incomprehensible feat was the transmission of thought from man to animal. Any one of the members or of the audience was requested to step up to the pony, extend his hand, and grasp the extended leg of the animal, thinking intently of a number or word; the animal would then touch the cheek of said person and immediately thereafter paw off the number thought of. This test was successfully tried by one of the students in the department, and by Drs. William Tag and A. F. Schreiber. During the progress of this feat Mr. McGuire stood quietly to one side and gave neither word nor sign.

The roll was not called, but most of the members and a large number of students and strangers from a distance were present.

WILLIAM TAG,
Secretary.

OHIO STATE VETERINARY MEDICAL ASSOCIATION.

MILLERSBURG, Ohio, September 26, 1894.

In accordance with a resolution passed at its last annual meeting, the Ohio State Veterinary Medical Association convened for its eleventh semi-annual session in the City Building of Millersburg, Holmes County, O., at 7.30 p. m., September 26, 1894, with Dr. J. D. Fair, of Berlin, O., presiding. Dr. J. D. Fair introduced to the members Judge W. Stillwell, who, in behalf of Holmes County and the city of Millersburg, delivered to the Association an address of welcome. The address was an excellent one, pithy, practical and not lengthy. It was responded to in behalf of the Association by our worthy presiding officer, who, in a few well chosen remarks, thanked the Judge and the city officers for their trouble in our behalf.

Roll-call showed a goodly number of members to be present, and as visitors Dr. C. L. Chase, Dr. L. P. Beechy, Dr. J. Yoder, Dr. O. W. Everly, Dr. Broompter, Dr. Caughey, Dr. Krider, Dr. W. C. Fair and Dr. H. Fulstow.

Dr. J. C. Meyers, Sr., read a very interesting paper entitled "Is it a Vegetable Toxicum?" in which he described several deaths in a herd of cattle due to some unrecognizable disease, in each of which death followed a certain train of symptoms. The paper showed great care in preparation, and that the doctor had put himself to much trouble in order to interest the society.

Dr. W. C. Fair.—I have had considerable correspondence with farmers who describe almost parallel cases, and I judge the trouble to be caused by the feeding of corn fodder, not rightly cured.

Dr. Torrence.—I would ask the essayist if the deaths described were all on one farm and if the cows in calf aborted?

Dr. Meyers.—I had no knowledge of the cows aborting, and the disease was confined to one farm. I would ask if any present have had any experience with corn stalk disease?

Dr. Cotton.—I have heard of this so-called corn stalk disease, but have never had the pleasure of seeing it. I was called to see three horses suffering with something that produced symptoms very much like the essayist describes; found

two dead and the third nearly so. Held post-mortem with negative results. Examined the pasture and could find nothing wrong with that, only that the owner had thrown about the field seven or eight tons of partially decomposed ensilage, the eating of which I believe caused the death of the animals. Decomposition of anything produces fungi, and corn fodder has its especial fungus, which propagates, and when in sufficient quantity becomes poisonous.

Dr. J. D. Fair.—I have seen two outbreaks of a disease showing similar symptoms, both of which were due to feeding bad ensilage thrown about in the feed troughs.

Dr. Gribble.—I was called to see a herd of Polled Angus in which eight out of about twenty died with symptoms similar to those described by Dr. Meyers. There were three herds of the cattle in three adjoining fields; the same creek watered all three, the cattle were all fed clover hay from the same stacks and corn and fodder from the same cornfield, yet cattle died in but one herd. On examination the fields were all apparently alike with this single exception, viz.: That in the field where the cattle died were three piles of threshed timothy hay. The owner said that when this hay was cut and bound a considerable quantity of short green grass was cut and bound with it, and that at the threshing time this green grass was covered with a whitish mould. These stacks were burned and the cattle still kept in the field, yet no others died. My theory of the cause was the cattle eating of a fungus due to decomposition in the hay piles.

Dr. Torrence.—Do not almost all cattle having impaction of the rumen or other stomach diseases suffer with different degrees of paralysis due to indigestion and reabsorption of gases? Some present thought the disease diphtheria and tried to show the analogy.

The veterinary bill which had lately passed the Ohio Legislature and become a law was read by the secretary, and a lively discussion followed. No one present was satisfied with its provisions, because all the good clauses of the original draft of the bill had been left out, so that it remained very little, if any, better than no law at all.

Dr. Cotton read a newspaper paragraph giving a decision of the Attorney General in which he was reported as saying that in his opinion the board of examiners for which the new law provides had the power to call any or all veterinarians before them for examination, no matter how many years they may have been in practice, or how many years had elapsed since graduation. This decision was a surprise, as it had not been intended that there should be a provision in the law for the assumption of any such authority; nor could any of us see where or in what section the law conferred such power upon the board of examiners.

The Association decided to support any member in a legal test if the board of examiners should undertake to compel him to be examined.

Dr. T. B. Cotton read a paper entitled "Veterinary Dentistry." This paper was well prepared from both a practical and scientific standpoint, showing that the writer had exercised considerable care and study in its preparation.

Dr. Torrence.—When a long lower molar must be cut off should the opposing molar be extracted?

Dr. Cotton.—No. Do not extract any molar tooth unless it is absolutely necessary, because, in my experience, it will give much trouble by the cavity continually filling up with food.

Dr. Gribble.—I have often extracted molars which now I am satisfied would have been better cut off. In two cases continuous filling with food irritated and prevented healing, each ending with maxillary fistula.

Dr. Beechy —I know a case where a molar was extracted more than a year ago, yet there is still an almost continual foul-smelling discharge from the nostrils.

Dr. Cotton.—I have even seen carious wolf teeth, and believe that decayed teeth can affect the eyes.

Dr. Derr.—I have a wolf tooth over three inches long and sickle shaped which I extracted from a five-year-old horse; could that not affect the eye of the animal?

Dr. W. C. Fair.—I believe that cattle suffer as much with diseases of the teeth as horses, and I have known plenty of cases in cows in which, when the teeth were examined and attended to, they were at once relieved. I tell you the teeth of cattle are very much neglected.

The general verdict sustained Dr. Cotton in not extracting molar teeth unless absolutely necessary.

Meeting now adjourned to meet at 8.30 the following morning.

THURSDAY, September 27, 1894.

Meeting was called to order by President Dr. J. D. Fair, at 8.45 a. m. Dr. H. Fulstow, of Norwalk, applied for admission to membership, stating that he was a graduate of the Ontario Veterinary College, class of 1892. Being vouched for by two members present, the application was at once acted upon and the doctor unanimously elected. Dr. S. G. Reed, a graduate of Ontario, and subsequently in practice in Kenton, O., having quit the practice of veterinary medicine, made application to withdraw from membership in the Association and asked that the withdrawal be dated from the time he quit practicing, 1891. In view of the fact that a withdrawal had been asked for at a previous time, and in some manner overlooked, the prayer of the petitioner was granted.

Dr. C. L. Chase read an essay entitled "Value of Post-mortem." The writer plainly showed to every practicing veterinarian the great value of post-mortems, which should by all means be made much oftener than they are. The paper was well prepared, and showed much study.

Mr. King, who claims to be an expert castrator of cryptorchids, was present and made a few remarks in reference to his methods, percentage of loss, and the percentage of so-called ridglings that really have one or more testicles floating in the abdomen. Of the latter he thought there were about one in eight.

Dr. Gribble.—I have had some experience in castrating ridglings, as my practice is almost wholly among stock-raisers, and among the last fifty-four so-called ridglings, I have found but four true ridglings.

Dr. Derr.—I have kept a record of about sixty cases and have met with only three true ridglings with testicle wholly within the abdomen.

The Holmes County Fair being in progress, all were invited to attend during the afternoon. Dr. Derr made a motion, supported by Dr. Cotton, that the president and secretary be empowered to issue orders on the treasurer for the payment of all bills incurred during this session. Carried.

The Association now adjourned to meet in Columbus, in January, 1895.

WM. H. GRIBBLE, D. V. S.,
Secretary.

IOWA STATE VETERINARY MEDICAL ASSOCIATION.

The Iowa State Veterinary Medical Association held its seventh annual meeting at the Savery Hotel, Des Moines, on November 15 and 16.

The meeting was called to order by the president, Dr. W. B. Niles, at 10 a. m. Roll call by the secretary, Dr. J. E. Brown, showed about twenty members present, consisting of Drs. Brown, Edwards, Heck, Hammond, Austin, Johnson, Morse, Lincoln, Niles, Miller, Paine, Stalker, Sayers, Starkey, Stewart and others. Drs. Adams, Day, Geddes, White, McCarthy, McCall, Peters, Wake and a few others were present as visitors. Letters of regret were received from Dr. Kennedy, M. D., of Des Moines, Secretary of the State Board of Health; from Dr. W. L. Williams, of Montana, and from two or three others who names are not at hand.

The president in his annual address called attention to several things seemingly of importance to the advancement of the profession. The following extracts show the tenor of the paper:

"Our Secretary has truly said in his circular letter, 'The veterinarian of all others should be a sanitarian.' How many of us in the past have paid much attention to sanitary medicine? Very few indeed. It is true that but few people ask for sanitary advice. Is not this condition largely the fault of the veterinarian? As he, in many cases, is not prepared to give such advice and has not impressed his patrons as having a knowledge of sanitary medicine, is it any wonder that he is not thought of in connection with such matters?

"The future veterinarian *must be* a sanitarian. Of all medical men he is best fitted for a sanitary officer; not only to guard the health of animals, but the public health as well; being more familiar than the human physician with comparative medicine, he better understands the animal plagues which are communicable to men and thus better understands the laws necessary for their prevention. The question of sanitation is exceeding important, not only from an economical standpoint, but on account of the danger to the public health. Tuberculosis in cattle has recently been shown alarmingly prevalent in many States, and well merits the attention it is now receiving. In this State the disease is without a doubt much more prevalent than is usually supposed and should receive the consideration of all medical men and the attention of all who are interested in our live stock interests and the health of the people.

"With the improvement in the value of horses which is already being manifested, and the widening field of the veterinarians work as shown by the increasing demand for meat inspectors, city veterinarians, and other sanitary officers, we sincerely believe that the veterinarian capable of taking his proper position in the field of medicine has a good future. It seems to us that the demands for veterinarians with a more broad and liberal education—men capable of taking the advanced positions of the near future, should be a lesson for some of our colleges to enlarge their curriculums and in other ways improve their facilities. It is with some alarm that we view the starting of so many new colleges which must, judging by the length of the college course, turn out 'horse doctors' rather than skilled, scientific veterinarians."

"Have we not more to fear from the poorly educated man with his diploma than from the non-graduates? Many think we have. Would it not be well for

us as an association to raise our requirements for membership as high as those of the U. S. V. M. A. and thus stand hand in hand with that society in resisting this threatened invasion of empyricism?

"Would it not also be well to put ourselves on record concerning army legislation? Last spring I wrote many of our Congressmen urging their support of the bill then in the hands of the Military Committee, and from most of them I received very encouraging replies. If we pass a resolution favoring such a bill it may have some weight. If all the State associations would do this it would surely help. Let us do our part."

The printing of the proceedings of the meeting by the association was also advised.

The secretary and treasurer in his report also called attention to some of the questions discussed by the president, urging their importance. His report showed the association in a prosperous condition financially and otherwise, the society having about seventy members in good standing.

The Board of Censors reporting favorably on the eighteen applicants for membership, they were duly elected. Many of these were present and took part in the meeting. The attendance of old members and the number of veterinarians joining was noted as being greater than for many years past.

The committee on legislation presented an instructive report explaining why desired legislation had not been secured. Although the bill introduced was only intended to regulate the title of the veterinarian, prohibiting non-graduates from assuming the title of the graduate, it could not be passed without amendments to which the committee could not agree; consequently, preferring no legislation to the passage of such an amended bill, it was not reported from the House committee to which it had been referred. It was found that many members of the Assembly feared the influence of the non-graduates in their localities and could not be induced to favor any bill which seemed to prevent them from practicing It will thus be seen that legislation failed largely from lack of influence.

The Committee on Collective Statistics made a brief report, stating some of the difficulties encountered in collecting satisfactory statistics, but recommending that the work be continued for another year so that the results might be compiled and thus made as valuable as possible.

Committee on the securing of the 1895 meeting of the U. S. V. M. A. reported that correspondence with Dr. Hoskins, the president of that association, revealed that the meeting would in all probability come West, and that any steps taken for securing it for Des Moines should be taken soon. Correspondence with a number of Western members showed they were heartily in favor of holding the meeting in Iowa.

The association acting on this report decided to take acttve measures to secure the meeting, and appointed a committee of three to undertake the work. An assessment of $2.50 each was levied to constitute an entertainment fund in case the meeting should be secured and the money needed.

Under the head of new business, several interesting questions were discussed and as suggested in president's address, committees on sanitation, publication, army legislation, and to consider advisability of preparing articles for the agricultural press were appointed. Notice of an amendment to the constitution, raising requirements for membership as high as those of the U. S. V. M. A., to be acted upon at next meeting, was given.

The proceedings so far described consumed the time of the morning and afternoon sessions. At the evening session, beginning at 8 o'clock, two valuable papers were read, one on "Meat Inspection at the Abattoirs," by Dr. S. Stewart, government meat inspector of Kansas City, and the other by Dr. G. A. Johnston, city meat inspector of Sioux City, Iowa, on "Meat Inspection at the City Market." Dr. Stewart's paper was illustrated by stereopticon views and described fully the character of government meat inspection. The kinds of diseased meats most frequently encountered were emphasized and many other points of importance touched upon. The paper was both interesting and instructive, and shed much light on a subject at present little understood by a majority of American veterinarians.

Dr. Johnson's paper was also a valuable contribution to sanitary literature. It gave the ordinance of Sioux City providing for the inspection of meats, fruits, etc., and mentioned the utter impossibility of the ordinance being carried out to the letter. The *modus operandi* as carried out by the writer was described. An opinion as to what city inspection should consist of, was also given. Both of the papers on meat inspection were very generally discussed and with much profit.

At the morning session on the 16th, about thirty members were present. Dr. W. B. Niles, of the Veterinary Department of the Iowa State College of Agriculture and Mechanic Arts, read a paper on "Milk and Dairy Inspection." This was illustrated by showing views of some of the bacteria which find their way into milk, and also of two tuberculous milch cows, apparently (judging by their appearance) in the best of health. In this paper the inspection of milk as carried out in Iowa was described, and reasons given why a more careful and extended inspection should be made, together with what, in the opinion of the writer, this should consist of. On account of its importance the subject of tuberculosis was given prominence, and the results of personal work with the tuberculin test given.

After a general discussion of this paper, hinging largely on tuberculosis and the tuberculin test, Dr. J. Miller, of Ottumwa, read an interesting paper on "Diseases of the Liver, Symptoms and Treatment." In this paper the writer described concisely a number of cases of liver disease coming under his observation during several years' practice; symptoms and treatment were made prominent. Quite a discussion followed, some thinking that if Dr. Miller had diagnosed *his* cases correctly, *they* had overlooked the disease in their own practice.

In a paper on "Flatulent Colic and Treatment with Trochar and Canula," Dr. Austin, of Newton, Iowa, described puncturing of the colon through the rectal wall. Cases were mentioned where efforts to relieve by puncturing through the flank failed, but relief was quickly afforded by rectal puncture. Discussion brought out the fact that repeated puncturing through the flank was not necessarily serious, and that abscesses did not often occur if instruments were sterilized before using.

Dr. A. B. Morse, of Des Moines, described as "an interesting experiment" a case in which spring-halt, caused by "tibial neurotomy," was subsequently cured by perineo-phalangeal tenotomy. A general discussion of operations for relief of bone-spavin lameness followed.

Dr. C. M. Day, of the Iowa State College of Agriculture and Mechanic Arts, read a paper on "Some Parasites of the Horse." The writer stated that the practitioner, in his opinion, should know more than is generally known of parasites coming under his observation in daily practice. The paper dealt with a few

species obtained principally from animals destroyed at the college for dissecting purposes. Owing to the lateness of the hour discussion was rather brief.

A voluntary paper was offered by Dr. A. R. Wake, of the Veterinary Department of the Iowa Agricultural College, on the "Tuberculin Test for Bovine Tuberculosis." In this the agent, tuberculin, was described, together with the *modus operandi* of its use as carried out in quite a series of tests in which the writer had assisted. The reaction obtained in some cases, what should be considered a reaction, and the reliability of the test, were points discussed. As the subject of tuberculosis had been extensively discussed before, discussion following this paper was not lengthy.

Election of officers resulted as follows: President, J. Miller, of Ottumwa; secretary and treasurer, J. E. Brown, Oskaloosa: vice-president, W. H. Austin, Newton.

Committee on Resolutions reported several, all of which were adopted unanimously. The most important of these was one calling attention to the prevalence of tuberculosis, and urging the necessity of more efficient sanitary regulations.

Before adjourning it was decided to meet at the call of the president and secretary. This closed one of the most, if not *the* most successful meeting in the history of the association. This result is extremely gratifying, especially to those who were instrumental in making the meeting a success. While there is much work for the association during the coming year, we believe the enthusiasm of the members will insure its accomplishment.

ILLINOIS STATE VETERINARY MEDICAL ASSOCIATION.

The twelfth annual meeting of the Illinois State Veterinary Medical Association was held at the Sherman House, Chicago, November 26, 27, 1894.

The meeting was called to order at 2 p. m., November 26, by the president.

The roll being called, the following members responded to their names: Drs. A. C. Alverson, A. H. Baker. F. L. Brown, A. Babb, L. Campbell, V. E. Frizzel, J. T. Nattress, C. E. Sayre, John Scott, R. W. Story, F. S. Schoenleber, A. M. Story, M. R, Trumbower, J. H. Ullrich, J. H. Tyler, M. Wilson, R. G. Walker.

The minutes of the last regular meeting were read and approved.

The president's annual address was then listened to.

The treasurer being absent from last regular meeting, was unable to make a complete report.

The reports of the standing committees were received and the committees discharged.

Drs. Gunning and Newby being absent, but having sent their papers, they were read by the secretary.

Dr. R. W. Story was then called upon for his paper on "Acute Indigestion."

The usual lengthy discussion of the disease followed.

The meeting adjourned until November 27, at 10 a. m.

NOVEMBER 27.

Upon reconvening the president called upon Dr. M. R. Trumbower, the State Veterinarian, who spoke on Actinomycosis and the methods pursued in the inspection of meats at the Chicago stock yards.

This was followed by many remarks from the members on the methods that ought to be pursued in the inspection of meats in the country, for local consumption, also on the dangers arising from the use of flesh and milk from diseased animals for human consumption.

Dr. Tyler was then called upon for his paper on "Omphalo-Phlebitis."

The meeting then adjourned until 2 p. m.

Upon reconvening Dr. C. E. Sayre was called upon for his paper on "Homœopathy in Veterinary Practice."

This paper brought forth quite an animated discussion, but was ably defended by Dr. Sayre from his standpoint.

Dr. S. S. Baker then read his paper on "Remarkable Cases in Practice," and was followed by Dr. Campbell in his paper on "The Unexpected Recovery of a Case of Sunstroke."

The following gentlemen's names were then proposed for membership: Dr. Harry G. Hoover, Am. V. C., 1894, Sterling, Ill., vouched for by Dr. Trumbower; Dr. Charles W. Johnson, Ch. V. C., 1887, Elburn, Ill., vouched for by Dr. A. H. Baker; Dr. E. L. Quitman, Ch. V. C., 1891, Chicago, Ill., vouched for by Dr. A. H. Baker; Dr. W. G. Neilson, Tor. V. C., 1891, Monmouth, Ill., vouched for by Dr. R. W. Story.

A motion was made by Dr. Wilson, seconded by Dr. Baker, that the above-named gentlemen be elected to membership by acclamation. Carried.

The election of officers resulted in the following named gentlemen being elected for the ensuing year: President, Dr. M. Wilson, Mendota, Ill.; vice-president, Dr. A. G. Alverson, Bloomington, Ill.; secretary, Dr. A. Babb, Springfield, Ill.; treasurer, Dr. R. W. Story, Princeton, Ill.

Board of Censors—Drs. C. E. Sayre, M. R. Trumbower, J. T. Nattress.

Dr. Wilson taking the chair, Dr. Trumbower made the suggestion that a new association be formed consisting of members in the Mississippi Valley.

Remarks in favor of such an association being formed were made by various members, and a motion made by Dr. S. S. Baker, and seconded by Dr. Trumbower, to the effect that the secretary be instructed to correspond with the secretaries of associations in surrounding States, regarding the formation of such an association, was carried.

The question of legislation regarding the introduction of a bill in the Legislature to regulate the practice of veterinary medicine and surgery in this State, was next discussed.

It was found that the members of this association present were in favor of the introduction of such a bill, and a motion made by Dr. A. H. Baker, seconded by Dr. Scott, that the sum of $10 each be subscribed to defray expenses of such a a bill, was carried.

Dr. Baker moved, seconded by Dr. Scott, that the chair appoint a committee of three, to be known as the Committee on Legislation, and such committee be given power to act. Carried.

The chair appointed as such committee, Drs. S. S. Baker, John Scott and J. T. Nattress.

Bills to the amount of $30.85 were audited and ordered paid.

The following standing committees were then appointed: Committee on Program, Drs. S. S. Baker, J. T. Nattress, T. J. Gunning; Committee on Arrangements, Drs. John Scott, A. H. Baker, M. R. Trumbower; Committee on Membership, Drs. J. L. Tyler, A. M. Story, W. J. Martin.

A vote of thanks was tendered the retiring officers for efficient services, also to the essayists, and to the proprietors of the hotel for their accommodations.

The meeting was adjourned to come together, at the call of the committee, in Peoria, next February.

MATTHEW WILSON, M R. C. V. S.,
Secretary.

Mendota, Ill.

United States College of Veterinary Surgeons

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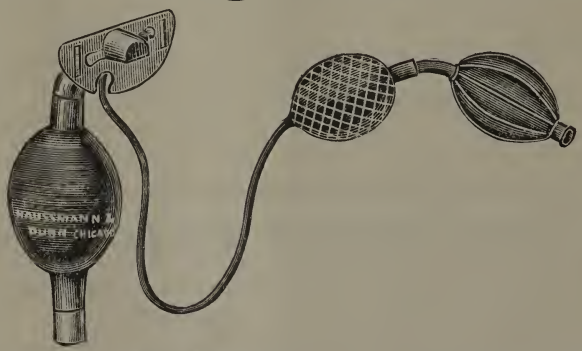

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VOL. I. DECEMBER, 1894. NO. 12.

THE DIAGNOSTIC VALUE OF TUBERCULIN AND ITS EMPLOYMENT IN COMBATING BOVINE TUBERCULOSIS.*

BY PROFESSOR BANG,
Veterinary School, Copenhagen.

In Denmark, tuberculin has been largely employed as a means of diagnosis. I have personally made numerous injections, and more than 150 autopsies of animals which have been submitted to injection, while as Chief Veterinary Surgeon to the government I have had before me all the reports made by veterinary surgeons on this subject. I may, therefore, be permitted to give, firstly a resumé of these investigations with regard to the diagnostic value of tuberculin.

I know of 300 autopsies of animals, more particularly bovines, which had been injected, and of this number I find that 36, or rather more than 9 per cent, have not given satisfactory results. But we would be justified in eliminating a large proportion of these cases. In 107 cases the injections were made under unfavorable conditions at the abattoir, on animals which had traveled long distances, and were exposed at the market all the day ; and this series has not yielded such good results. In other cases, dating from the commencement of my investigations, the dose of tuberculin employed was too small, and in others, again, there was certainly a rise of temperature, but so trifling that no decision could be arrived at.

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If I eliminate these doubtful cases, there remain 272 autopsies, and of this number I only find nine, that is, a fraction over 3 per cent, which have not verified the results of the injection.

Consequently, I can assert that tuberculin, when employed in a satisfactory dose and in favorable circumstances, permits a precise diagnosis in 98 per cent of the cases ; and when reflecting that it acts in this manner in cases, the majority of which are those of only slightly-developed tuberculosis, altogether insignificant, and often limited to some small nodules hidden in the substance of lymphatic glands, we cannot too highly appreciate tuberculin as a means of diagnosis, if we cannot declare it to be infallible.

The errors are of two kinds. In very rare instances the autopsy is made of an animal which exhibited an undoubted reaction, and yet did not show a trace of the disease. I have observed two cases of this kind. But it should not be forgotten that the autopsy of an animal whose flesh is to be sold as food can never be made in a complete manner. It is true that we may examine those organs which are usually the seat of tuberculosis, but we cannot deny the possibility of tubercular deposits in some other part of the body ; indeed, it is possible that the most experienced observer may fail to perceive small granulations which are deposited in the lymphatic gland of a fat ox.

A little more frequently we find at autopsies tuberculous affections in animals which, during life, did not show an amount of hyperthermia sufficient to warrant the conclusion that tuberculosis was present ; but in the majority of such cases the tubercular deposits are very small and old (calcified), so that their virulency may be doubtful. In other cases, again, the animals are very badly affected, and the tubercles are disseminated in nearly every organ ; in these the absence of reaction is without value from a practical point of view, because the clinical signs suffice to form a diagnosis.

There is yet a circumstance in which reaction sometimes fails, and this is when the test is repeated ; this may happen not only when we repeat the injection a short time after the first reaction, but when it is repeated at the end of the year. This default of reaction I have found in twenty of the eighty animals which formed the sick division in a large dairy, the entire establishment of which I examined.

In order to ascertain whether recovery had taken place, four were slaughtered, and these were all found tuberculous; in three the deposits were very ancient and small, and in the fourth the disease was not so extensive, yet not slight, and the appearances were not such as to warrant belief in progressive recovery. Consequently, I came to the conclusion that it is well to rely upon the first reaction when a dairy has to be divided into a healthy and a diseased section.

Tuberculin having been recognized as an excellent means for the early diagnosis of tuberculosis, it becomes necessary to discover the best way to employ it in combating that disease in bovines.

As contagion plays the principal part in the propagation of tuberculosis, the first thing required is the examination of all the animals in a dairy by means of the tuberculin, and the placing of the healthy in a shed apart from the tuberculous. But what is to be done with the latter? Is it absolutely necessary to fatten them rapidly and prevent breeding from them, as Nocard insisted upon at the Third Congress on Tuberculosis held in the past year?

This question is of great practical importance, because it is an undoubted fact that, in the large dairies, when tuberculosis exists in them, it is so prevalent that the number of cows which give a hyperthermic reaction may be as high as eighty per cent. It is therefore evident that it must occasion an enormous loss to the proprietors to slaughter a large majority of their best milch cows, and to deprive them of the possibility of maintaining their stock without buying more—a matter of great importance when the cows are good. In my opinion such a course is much too severe. Why not keep for years those cows which are apparently healthy, and do not exhibit the least sign of tuberculosis except the febrile reaction after injection? And why, also, prevent their breeding? The great majority of such cows are only affected in a very slight degree; a good many of them have only some small nodules in the lymphatic glands, and there is no reason to believe that tuberculosis would rapidly develop in such animals. Frequently enough the disease remains limited for years, and in some it is even possible for recovery to take place; at least I have very often found small and perfectly calcified tubercular deposits in aged cows. Such cows might give birth for years to absolutely healthy calves.

I am inclined to attribute to direct heredity—that is, contagion from mother to fœtus—a larger share in the propagation of tuberculosis than Nocard does. Up to the present time I have examined twenty cases of tuberculosis in the fœtus and newly-born calves, but the disease is never transmitted to the fœtus unless the mother is in a very advanced stage of the disease—probably always generalized. When the cow is only slightly affected, the calf is always born healthy.

I am therefore of opinion that all the tuberculous cows, apparently healthy, should be kept, and allowed to breed; but, at the same time, they ought to be well separated from healthy animals, and their calves should be removed from the infected sheds immediately after their birth. The use of the uncooked milk as food for the calves should be absolutely interdicted. This is a matter of great moment, on which my investigations in late years have thrown much light. The autopsies of calves which were shown to be tuberculous by test injection have demonstrated that the majority were infected through the alimentary canal—in all likelihood by raw milk. Among thirty-five calves belonging to large dairies, I have found the tubercular lesions in twenty-four exclusively, or at least predominant, in the retro-pharyngeal or mesenteric glands; and a good number of autopsies made by others have yielded the same result. It is, therefore, absolutely necessary to interdict the use of uncooked milk for the calves, and I am convinced that this very simple measure would get rid of a large portion of bovine tuberculosis. It is true that new-born calves cannot very well get through the first few days of their existence without colostral milk, but already, on the second day, they manage very well on cooked milk. With regard to the colostrum, it may not be boiled, but it can be heated to 65° (Cent.?); this temperature will not kill the bacilli, but it will diminish their virulence. I am in the position of being able to demonstrate by practical experience the truth of these assertions.

Two years ago I began an experiment, having for its object successive purification of a large dairy in which tuberculosis was present. This was on an extensive farm in Seeland, and contained 208 cows of the red Danish breed. For two years cases of tuberculosis had cropped up, but only in the majority of the large sheds, and there were very few of the animals which did not appear to be quite healthy. Nevertheless, when

tested with tuberculin, eighty per cent of the milch cows, forty per cent of the bulls, and forty per cent of the calves and heifers gave a febrile reaction. After a careful disinfection, I divided the shed by a wooden partition, and the people who attended to the diseased were not allowed to enter the portion where the healthy animals were kept, and *vice versa;* every possible care was also taken to prevent all communication between the two divisions, directly or indirectly. It was decided to rear the calves from the affected cows, as well as those from healthy mothers. Immediately after their birth the calves were removed to a clean stable, and after the second day they were fed on boiled milk; and in order to get rid of creatures which were tuberculous at birth, I tested by tuberculin all those of a few weeks old; but up to the present time none of them have been found diseased.

Each year I have twice tested the animals in the healthy portion of the sheds with tuberculin—in the spring before being turned out to pasture, and in the autumn immediately after being housed. The first year the separation between the two portions of the cowhouse must have been insufficiently maintained, for the injection on each occasion produced an elevation in about ten per cent of the animals which had been put into the healthy part. It is needless to say that these were segregated at once. At the autumn testing, eighteen months after the commencement of the experiment, only one animal of 107 showed hyperthermia, which was very slight; and the testing this spring has revealed two of 122 animals suspected of tuberculosis. None of those born on the farm after the commencement of the experiment, and whose mothers, for the most part, belonged to the diseased section, have shown any febrile reaction during these two years. It therefore seems to me to be demonstrated that it is possible to rear a healthy herd on a farm where there is an infected herd, the two being only separated by a wooden partition, and that this will prove successful even when the calves from diseased cows are reared. Here, then, is the most natural and least costly way to get rid of tuberculosis.

This experiment was made at the expense of the State, but the Danish government has done much more to assist the owners in their combat against tuberculosis. Since 1893 we have had a law which places at the disposal of the government for five years an annual sum of 50,000 kroners, to help those who are

desirous of making use of tuberculin. Since 1893, all the tuberculin employed in Denmark has been prepared in my laboratory. On the condition of being able to satisfactorily separate the diseased from the healthy cattle, owners can obtain gratuitously the testing of their stock by a veterinary surgeon, who is paid to make the injection, and take the temperatures before and after the operation. According to the law, it is only the young animals which are tested gratuitously, but the owners who desire to have all the herd tested may have this done at a very small expense, and I, who distribute the tuberculin, favor the application of this measure as much as possible, especially in moderate-sized dairies. In the majority of the peasants' cowsheds this measure is resorted to.

Up to the present the test has been applied on 327 farms containing 8,401 animals, of which 3,362 have shown the febrile reaction. I will not mention all the results that may be drawn from these experiments, but will cite a few.

It has been found that tuberculosis is distributed in a very different manner in the various parts of the country. It is much more prevalent in those localities—as might have been predicted—in which cattle are often changed than in those where they are not renewed. It is, in general, more prevalent in large dairies than in moderate-sized ones, and among milch cows than among young animals. The number of animals affected in a stable also differs widely; often the number is terribly high, in others it is very small, and especially in the peasants' cowsheds. But what to me appears to be of the greatest interest, is the large number of dairies which are perfectly healthy. At present I know of fifty-two, in which the number of cows varies from ten to forty-two.

The existence of a large number of herds, absolutely healthy, in a country in which the disease is wide-spread, distinctly demonstrates that the hypothesis of the ubiquity of the tuberculosis bacilli—an hypothesis which would paralyze all efforts to extirpate bovine and human tuberculosis—is false.

TREATMENT OF BRONCHITIS AND PNEUMONIA.

By H. R. Macaulay, V. S.,
Dean of the Indiana Veterinary College.

In order to prevent repetition, let it be understood that the remarks I will make regarding hygienic surroundings, food and blanketing, will be applicable to cases of either bronchitis or pneumonia.

As to the hygienic surroundings and general comfort, the stall should be roomy and light; there should be fresh air in abundance, and a temperature as nearly 60° F. as can be maintained. Always leave a bucket of cold water before the horse, and have this frequently changed to insure its being pure and sweet. If not frequently changed it will soon be fouled with the nasal discharge.

Regarding blanketing of the horse, I take issue with those who believe that it is indispensable. A horse with bronchitis or pneumonia requires but little if any clothing, and I believe that great injury is done by over-blanketing an already above normally heated horse. It has been estimated that 77 per cent of the heat that passes from the horse finds its exit through the skin. With this channel practically closed by heavy blankets, the lungs, which in health throw off some 25 per cent of this heat, are required in their weakened, diseased condition, to throw off more than their normal share from the now excessively heated system. Any treatment causing such a condition of affairs is manifestly wrong.

If the surroundings are such that it is considered necessary to blanket a horse in order to protect him from draughts, let the clothing be put on in moderation, and see that the surcingle is not too tightly drawn around the chest.

In the matter of feeding the patient, how many of us are apt to be autocratic and prescribe exactly what food the horse shall have. It is better to find what he wants and let him have that. In lung troubles we will never be far from right in following the promptings of nature. The horse's bill of fare is at most a very restricted one, and we need not be long in doubt as to what he desires.

Years ago, both in medical and veterinary practice, it was thought good treatment not to allow the sufferer any cold drinks, although the system craved cold. It is different now; we are broader in our views, and allow nature to satisfy her cravings. It is generally true that the system craves what it needs and this is applicable to solid as well as liquid food. Many practitioners prescribe laxative food, such as mashes—a kind of food that is particularly repugnant to the sick animal, and in warm weather a source of annoyance by reason of the flies it attracts.

When asked by an attendant, "What shall I feed him?" my advice always is, "Let him have anything he wants and eats with a relish." In my practice I have found that horses suffering from lung troubles prefer yellow corn to any other kind of corn, eating five or six ears with relish, when they will not touch white corn, oats or mashes. I know that we are apt to be met with that old bugbear of a cry, "corn is too heating," but this is the veriest nonsense. The corn gives the animal so much extra strength to resist the inroads of the disease.

Presupposing a case comfortably housed, fed and treated as above, let us consider the medical side of the treatment.

Bronchitis.

As a rule we do not see more than one-half of our cases of bronchitis in the early stages, but for those we do see in this stage, what line of treatment should we prescribe? In order to act intelligently, it is necessary that we be thoroughly conversant with the pathological changes occurring in the early stage of the disease.

We find all the attendant symptoms of inflammation, the mucous membrane lining the bronchial tubes intensely congested, and more or less infiltration between the mucous and sub-mucous tissues. The function of the mucous glands, which in health secrete sufficient mucus to keep the membrane moist, is interfered with, and as a result the membrane becomes dry. This mucous membrane is covered by ciliated epithelium whose special function is to keep the moisture, secreted by the mucous glands, moving up the tubes toward the larynx. Were it not for this structure the pulmonary secretions would gravitate

to the lowest point of the respiratory passages. This pulmonary epithelium, which is at all times easily injured, becomes weakened and is readily blown off during spells of coughing produced by irritation to the now very sensitive mucous membrane. The loss of this ciliated epithelium in bronchitis is serious, as with it gone we have nothing to prevent the gravitation of the mucous secretion that will appear in abundance during the second stage; consequently, a serious capillary bronchitis, with occlusion of the smaller tubes, is very apt to follow.

The first or dry stage of bronchitis usually lasts four or five days. Our treatment during this stage should be to allay bronchial irritation and arrest severe spells of coughing, thereby saving much ciliated epithelium. To best attain this result we should use remedies that are sedative in action on the lungs. Such drugs have been termed *sedative expectorants*, and probably the best of these is citrate of potash, given in combination with opium or its alkaloid codeine, or with belladonna. I am aware that many practitioners object to the use of the latter remedy in early stages of bronchitis, but it certainly is efficient in allaying cough, and the action it may have in arresting the secretions of the mucous glands need not be considered, as such action can be overcome, if deemed necessary, by judicious inhalations of steam. This line of treatment should be continued during the first four or five days, or until the second stage of the disease makes its appearance.

The second stage will readily be noticed by the excessive mucous discharge from the nostrils. The mucous glands that in the the first stage were inactive have now become excessively active, and secrete an abnormally large quantity of fluid of somewhat different ingredients from those found in health. The cough in the second stage is softer and more frequent. Nature now attempts by the coughing to expel this oversecretion, which would otherwise accumulate, gravitate and cause asphyxia.

Our line of treatment in this stage must therefore be to assist the system in its expulsive efforts, and to do this we prescribe what are termed *stimulating expectorants*—directly opposite to the class of drugs used in the first stage. There are a number of good stimulant expectorants, but the best is probably the muriate of ammonia, with oil of eucalyptus and squills following closely in order of importance.

Muriate of ammonia ranks first, because of its efficacy and cheapness. To maintain a continuous action, one dram doses should be given every two hours. Ammonia compounds are fugacious in action, so that at the end of two hours the one dram dose will have worn itself out. This stimulating treatment should be continued for several days, until there is an abating of the symptoms.

In suffocative bronchitis, where the accumulated mucus threatens speedy asphyxiation, the 1 per cent solution of nitroglycerine is recommended, although why it should act as beneficially as it does is somewhat obscure, though it is known to act upon the heart and arteries.

Another very essential part of the treatment of bronchitis is the inhalation of medicated steam. Bronchitis is now conceded to be of microbic origin, and the pathological changes noticed are believed to be due to the action of a germ which is found in the excreted mucus. This being so, what treatment can possibly be more efficacious in the destruction of this germ than the inhalation of a vapor laden with, to it, a death-dealing germicide. The remotest portions of the bronchial tubes are those subjected to actual contact with the vapor medicated with creosote, camphor, turpentine, carbolic acid or eucalyptus.

The inhaled *vapor acts in three ways* on the diseased lungs: First as an *antiseptic*, and second as an *expectorant*, by loosening the tenacious mucus and allowing it to be coughed up, and thirdly as a *sedative* that continues to act for some time after the inhalations of vapor have ceased. A horse should not inhale vapor more than fifteen or twenty minutes at a time, otherwise its action will be weakening. In purulent bronchitis turpentine, both by the lungs and by the stomach, is particularly efficient.

Pneumonia.

Pneumonia is frequently intimately associated with bronchitis, the latter extending to deeper structures and gradually bringing about broncho-pneumonia. This is one of our most common pneumonias. We do not meet with the acute (lobar) and interstitial forms of pneumonia, the latter being merely an advanced stage of the former.

The pathological changes occurring in all these pneumonias are very similar, the chief differences being that in the lobar form usually but one lung is affected. Consolidation of the lower lobe is a prominent symptom early in the disease, and there is but little expectoration, while in broncho-pneumonia the disease develops more slowly and is accompanied by some marked bronchial symptoms.

In pneumonia there is first the *congestive stage*, during which there is an extra amount of blood in the inflamed region. This is followed by stasis of blood in the capillaries, veins and small arteries. Now, although this is the condition present, we find many authorities advocating the use of aconite or veratrum viride, two of the most powerful heart sedatives known. It is true that they advise the administration of these drugs only in the early stages, but why they should advocate their use in any stage is a mystery to me. Instead of giving a heart sedative, it seems to me that the rational and proper treatment is exactly the reverse. Give a strong cardiac and arterial stimulant and force the blood through the congested vessels. The drug that best fulfills this requirement is digitalis. Its action is on the heart muscle and on the muscular walls of the arteries, causing a firm contraction of both heart and arteries, thus forcing the stagnant blood along and relieving the engorgement of the arterioles, capillaries and veins. I see that in medical practice Professor Petrosco, of Europe, uses digitalis, and this only, in all pneumonias, with a mortality of only 1.22 per cent. He gives digitalis in large doses, and finds that it usually aborts a case of pneumonia in three days. With such a record in practice of human medicine it is surely worth a more extensive trial by veterinarians.

Another very valuable remedy in pneumonia is whisky or alcoholic stimulants. When given by the mouth the first action of alcohol is on the mucous membrane of the stomach. It stimulates secretion of gastric juice, and thereby aids digestion. Experiments have proved that after absorption it remains in the blood plasma, is readily oxidized, and forms there a pabulum or food for the cells. Another of its actions, and one that is of the greatest benefit in a case of pneumonia, is its power to retard tissue waste. This action alone should recommend its use in all cases of lung trouble. With this retarding of tissue waste there is a lessening of one of the waste products—

carbon dioxide. With the lessening of this gas, the diseased lungs are correspondingly relieved of an amount of work they would otherwise have to perform. Another important result of this retarding of tissue waste is that the whole system is kept in a purer and more healthy condition.

In urgent cases of pneumonia, as in bronchitis, nitro-glycerine is of great service. It undoubtedly relaxes the muscular wall of the arteries and invites the blood from the capillaries and veins. In its action on the arteries nitro-glycerine resembles alcohol, but is much more prompt in producing dilatation.

Another system of treatment that I have followed very successfully in conjunction with the systemic treatment in advanced cases of pneumonia is the so-called "abscess of fixation" treatment. This was originally adopted in medical practice by Dr. Raoul, of France, and consists in the injection into the body some distance from the thoracic cavity, of some irritant, as turpentine. This, in all cases where the system is strong enough to respond will cause an abscess at the point of injection, and by its counter irritation will cause a flow of blood to the part, thus relieving the inflamed lung. You will notice that by this form of counter-irritation you form a reservoir for blood at a considerable distance from the diseased lung, in this respect differing entirely from the usual mode of counter-irritation, where a blister is applied directly over the inflamed area.

I will now digress a little and give an experience that I had with a case about two years ago. There is an old adage to the effect that we often stumble upon truths through mistakes that we make. I was called to see a valuable horse that had been sick for some nine days. The animal was in a desperate condition, respiration shallow and labored, temperature 105 3-5, no appetite, greatly weakened and staggering. On percussion, I found that two-thirds of both lungs gave forth no resonance whatever. My diagnosis was hydrothorax, and I seemed to be justified in this conclusion not only by the examination but by the result of a superficial autopsy upon a horse that had died the previous night in the next stall, after having apparently suffered excessively as this one was doing. The pleural cavity in the dead horse contained a very large quantity of fluid. Well, I used the trocar and canula on the live horse, and, imagine my surprise and embarrassment when there followed,

instead of serum, a stream of very dark blood. I said nothing, but thought a good deal. I was wrong in my diagnosis; instead of a hydrothorax, the animal had a very bad double pneumonia, and the canula was in the lung tissue. I allowed this dark blood to flow until I had extracted nearly a quart, when the horse was seized with a violent fit of coughing and blood was discharged from the nostrils. I then withdrew the canula and ordered a strong dose of whisky. When I left my prognosis was decidedly unfavorable; I had no hope whatever for the animal, so you can imagine my surprise on seeing the horse about three hours later to find him in every way improved, and with a temperature of only 102. From this time on there was an uninterrupted recovery.

This has been the only time before or since that I have made a wrong diagnosis in such a case, and I have often been glad that I did, for I firmly believe that the local depletion saved the horse's life. On no other ground can I explain the almost immediate improvement and rapid fall of temperature. On first seeing the case I did not think the animal could survive the next twenty-four hours.

I relate this case for what it is worth. I have not had opportunity to verify it by repetition, but I certainly intend trying the same procedure with the next case I find *in extremis*.

Regarding the application of blisters to the thorax in cases of bronchitis and pneumonia, I will not dilate. There have been during the past year many arguments, pro and con, in the English veterinary journals. Professor McCall, Edinburgh, advocates their use, while Professor Williams, of London, contends that they are injurious. For my part, I incline to Professor William's belief, and in no case of lung trouble do I blister the sides. I believe that they in all cases augment the disease. In every case where a blister takes hold of the sides of a horse suffering from any lung trouble whatever, we find that it causes pain and shallow breathing. This shallow breathing, you are told, does not last very long, but even the shortest time is too long. Without entering minutely into the question of blistering, I will mention briefly why it is considered bad practice:

While the blister over the sides is causing pain, the horse breathes as shallow as possible, so as not to stretch the muscles under the blistered area and thereby cause himself pain. If it

were possible he would not breathe at all, but as this is something that he cannot help doing, he makes it as easy as possible, using only the upper portion of the lung, while for the time being the lower lobe is not used. The consequence is that from lack of elastic contraction of the lung tissue in the lower lobe there is an increased congestion and greater stagnation of blood about the inflamed area.

Many a horse lives through a pneumonia after his sides have been severely blistered. These cases, I contend, live not because of benefit derived from the blister, but in spite of the injury done. I do not believe that blistering produces any beneficial after effects. Before the horse's system can again regain the normal, it must expend an amount of force sufficient to overcome the additional congestion due to the blister. In cases where you deem it advisable to use counter-irritation, try the "abscess of fixation" treatment; that has none of the local injurious effects produced by blistering the sides.

MATERIA MEDICA AND THERAPEUTICS.

By Dr. E. S. Muir,
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Ether.

Ether.—Sometimes wrongly termed "sulphuric ether."

Preparation.—There is no officinal method given by the last edition of the pharmacopœia for the preparation of ether; the English method is as follows: Take of rectified spirits fifty fluid ounces (imperial measure), sulphuric acid, ten fluid ounces (imperial measure); chloride of calcium, ten ounces (avoirdupois); slaked lime, half an ounce (avoirdupois); distilled water, thirteen fluid ounces (imperial measure); mix the sulphuric acid with twelve fluid ounces of the spirit in a glass flask having a wide neck and capable of containing at least two pints (imperial measure) and not allowing the mixture to cool, connect the flask by means of a bent glass tube with a Liebig's condenser, and distill at a temperature sufficient

to maintain the liquid in brisk ebullition. As soon as the ethereal fluid begins to pass over, supply fresh spirit through a tube in the flask in a continuous stream and in such quantity as to equal the volume of the fluid which distills over. For this purpose use a tube furnished with a stop-cock to regulate the supply, connecting one end of the tube with a vessel containing the spirit raised above the level of the flask and passing the other end into the acid fluid through a cork fitted into the flask. When the whole of the spirit has been added and forty-two fluid ounces have distilled over, the process may be stopped. Dissolve the chloride of calcium in the water, add the lime, and agitate the mixture in a bottle with the impure ether. Leave the mixture at rest for ten minutes, pour off the light, supernatant fluid and distill it until a glass bead of the specific gravity, 0.735, placed in the receiver begins to float. The ether and spirit retained by the chloride of calcium and by the residue of each rectification, may be recovered by distillation and used in a subsequent operation.—[Br.]

Description.—Ether is a liquid composed of about seventy-four per cent by weight of absolute ethyl oxide and about twenty-six per cent of alcohol and contains a little water.—[U. S. P.]

Formula.—$(C_2H_5)_2$ O. It is a colorless, transparent, mobile liquid, very inflammable and very volatile. It has a peculiar penetrating, characteristic odor. The specific gravity is 0.735 to 0.750. Ether belongs to the fatty series of the carbon compounds. The taste is burning and sweetish, not so sweet as chloroform. It should evaporate without leaving any residue. Ether boils at 37° C. Only slightly soluble in water, but will mix in all proportions with chloroform, benzine, alcohol and the fixed and volatile oils. The vapor of ether if mixed with air will explode if ignited. Ether should be kept in well-corked bottles, or better in tin cans, which should be sealed. There is official in the pharmacopœia a preparation under the name of ether fortior, or stronger ether; this differs from the former only in the amount of ethyl oxide it contains, having ninety-four per cent of the latter, with a very small proportion of alcohol and water. The specific gravity of stronger ether is from 0.716 to 0.725 C.

Therapeutic actions.—Anæsthetic, carminative, antispasmodic, stimulant.

Therapeutics.—While ether is a fairly safe anæsthetic, whether in the human family or on the lower animals, it is hardly strong enough for use on the horse. I have seen two and one-half pounds of Squibb's ether given to a horse in the space of an hour without producing anæsthesia. On a horse, chloroform is the anæsthetic to use. As a stimulant ether is of advantage in shock bordering on collapse, as the depressent action on the heart is *nil*, it having a primary stimulating action on that organ. Ether has for years been one of the ingredients in all the colic mixtures of the old style "horse doctor," and it is not without its value in this disease, but we have so many other far better antispasmodics for colic in the horse, that the rising generation of veterinarians has to a great extent placed ether in the secondary list.

This drug has been used as a tænicide in the human family and on dogs with success. It should be given in full doses and followed in a few hours by a brisk cathartic of castor oil. It is the best anæthetics to use on the dog, and should be administered undiluted with air, in the same manner as it is administered to a person. Dogs and cats are very easily etherized. Ether has been and is still used by some veterinarians as a local anæsthetic, being applied in the form of a spray until the part is almost frozen ; by this method abscesses may be opened and some of the minor surgical operations performed without causing much, if any, pain. It is, however, sometimes followed by considerable irritation and degeneration of the part. It is more superficial in its action and far inferior to cocaine. The latter has almost entirely superseded ether as a local anæsthetic. Mixed with tincture opium it is used as a spray on sore tendons of running horses just before a race.

Doses.—For horses, 30 to 60 cc. ; cattle, 60 to 90 cc. ; sheep, 7.5 to 15 cc. ; dogs, 1.875 to 3.75 cc. (as a stimulant).

The lethal dose differs in different animals of the same species, the amount varying from 20 to 40 cc. in the smaller animals.

Official preparations.—Spiritus ætheris. Spiritus ætheris compositus.

Chloroformum.

Chloroform.—Formula, $CHCl_3$. Specific gravity, from 1.490 to 1.473.

Preparation.—This valuable anæsthetic, antispasmodic and antiseptic is prepared by purifying commercial chloroform. The commercial variety is unfit for anæsthesia, but may be used for external use and various pharmaceutical purposes. Chloroform is prepared by mixing six parts of chlorinated lime with twenty-five parts of water, transferring the mixture to a still and then adding one part of alcohol; chloroform containing a small proportion of alcohol begins to distill over when the temperature reaches 40° C. After being washed with water it constitutes commercial or crude chloroform.

The process for purifying it is given in the U. S. D. as follows: Commercial chloroform, 200 parts; sulphuric acid, forty parts; carbonate of sodium, ten parts; lime, in coarse powder, one part; alcohol, two parts; water, twenty parts. Add the acid to the chloroform and shake them together occasionally during twenty-four hours. Separate the lighter liquid and add to it the sodium carbonate previously dissolved in the water. Agitate the mixture thoroughly for half an hour and set it aside; then separate the chloroform from the supernatant layer, mix it with the alcohol, transfer it to a dry retort, add the lime, and take care that the temperature in the retort does not rise above 67.2° C.; distill by means of a water bath into a well-cooled receiver until the residue in the retort is reduced to two parts. Keep the product in a glass-stoppered bottle in a cool and dark place.

Description and properties.—Chloroform having the formula $CHCl_3$ is chemically trichlor-methane, or methane (marsh gas), CH_4, in which three of the atoms of hydrogen are replaced by Cl. It was discovered by Mr. Samuel Guthrie, of New York, in 1831, who obtained it by distilling a mixture of chlorinated lime and alcohol. It is a clear, heavy, colorless liquid, with a sweet, burning taste and a pleasant, ethereal odor. Mixes in all proportions with alcohol, benzine, ether, and the fixed and volatile oils, only sparingly soluble in water (one to 200). Boils at 60° C. It is an excellent solvent of caoutchouc, gutta-percha, iodine, bromine, and most of the resins, balsams and fats. The alkaloids, quinine, atropine, strychnine, aconitine, brucine and caffein, are all soluble, from fifteen to twenty per cent, in chloroform. The alkaloidal salts are less soluble; sulphate of quinine is wholly insoluble in it.

It is the best solvent we have for camphor. Unlike ether, it is not inflammable, but it is very volatile.

Therapeutic action. Anæsthetic (local and general), antispasmodic, antiseptic, counter-irritant, stimulant carminative, stimulant.

Therapeutics.—Chloroform is the best anæsthetic to use on the horse, ether being too weak. A strong, healthy horse may be completely anæsthetized with from sixty to 100 cc. of purified chloroform. On the dog it should be used with as much caution as on one of the human family. In spasmodic colic it is of as much value as chloral, to which drug it is very closely allied. In small doses, especially when combined with alcohol, chloroform is a powerful heart stimulant. It has a rubefacient and counter-irritant action when applied locally and prevented from evaporating by bandages, oiled silk, oiled muslin, or some other impervious material. Small doses stimulate the movements of the stomach and the secretions of the gastric juice. It increases and harmonizes the movements of the stomach and intestines, thereby relieving griping and causing the expulsion of flatus. Spasmodic cough in animals is relieved by the inhalation, or by the internal administration of chloroform. It may be mixed with belladonna or opium and given in flaxseed tea or gruel. It may be applied locally in the form of liniment chloroformi to relieve the pain of rheumatism and other local inflammations. Opium, aconite and other sedatives may be mixed with it to form a liniment. For spasmodic colic the full dose of thirty cc. may be given, but not repeated, and only in violent cases.

Toxicology.—The danger accompanying the administration of chloroform vapor is, (1) heart failure; (2) paralysis of respiration; (3) shock. In the second case the patient may be saved by stopping the administration of the drug, admitting pure air and resorting to artificial respiration. In cardiac arrest the danger is much greater. This is caused by allowing the vapor to be inhaled in too concentrated a form, and is indicated by a sudden stoppage of the heart, and dilatation of the pupils; respiration may continue.

In heart failure due to the action of chloroform vapors, the body should be elevated above the head, vapor of amyl nitrite administered, and artificial respiration resorted to, or a Faradic current may be used to stimulate the respiration, one pole

placed under the belly just back of the point of the sternum and the other to the side of the neck. Artificial respiration should be used at the same time. When a toxic amount of chloroform is swallowed it causes gastro-enteritis by its local action, and afterwards, when absorbed, produces anæsthesia and coma. This local irritant action causes vomiting, colic and purging, but when the stupor comes on these symptoms gradually cease. The usual emollients, demulcents and sedatives should be administered in these cases, with the inhalation of amyl nitrite. Hypodermics and inhalations of ammonia may be used. Artificial respiration should never be forgotten.

Doses.—Horses and cattle, 3.75 cc. to 30 cc.; sheep and pigs, 1 cc. to 3 cc.; dogs, .33 cc. to 1 cc.

Chloroform should always be administered suspended in some mucilaginous or demulcent fluid. Syrup or flaxseed tea are very good.

Official Preparations.—Aqua chloroformi, prepared by making a saturated solution of chloroform in distilled water, and always having an excess of chloroform in the bottle.

Emulsum Chloroformi.—Chloroform, 40 cc.; expressed oil of almonds, 60 cc.; tragacanth, 15 gm.; water, a sufficient quantity to make 1000 cc. Mix the chloroform and the tragacanth in a perfectly dry bottle, add the water, agitate the bottle until they are thoroughly incorporated, then add the oil of almonds in several portions, shaking after each addition. When a perfect emulsion is formed, add enough water to make the whole 1000 cc.

Linimentum Chloroformi.—This is a solution of chloroform (300 cc.) in sufficient soap liniment to make 1000 cc. They are mixed by agitation.

Spiritus Chloroformi.—Take 60 cc. of chloroform and mix it with sufficient alcohol to make 1000. cc.

Opium.

Natural Order.—Papaveraceæ.

Habitat.—Western Asia (cultivated).

Description.—Opium is the concrete milky exudation obtained from the unripe capsules of papaver somniferum, in Asia Minor. This is known as Smyrna opium and is the best variety. It is in the form of irregular or sub-globular

cakes, which vary from 120 gm. to 1000 gm. When fresh it is a sticky mass of a chestnut-brown color, having a peculiar unpleasant, narcotic odor, and a bitter, disagreeable taste. The lumps are generally covered with poppy leaves, or the leaves of a variety of rumex. After being exposed to the air it loses moisture and becomes harder and lighter in weight. It is not readily pulverized, except when perfectly dry ; it is then of a light-brown color. The heat used in drying the drug must not exceed 85° C. To meet the requirements of the U. S. D., opium must contain, in its natural, moist condition, at least nine per cent of crystallized morphine, and the powdered opium must contain not less than thirteen per cent, nor more than fifteen per cent of the alkaloid. Opium is obtained from several species of the poppy plant. That plant usually described as the opium poppy, is one of the varieties of papaver somniferum, and is known as the "white poppy," on account of its having white seeds. It is an annual, with a round, smooth, branching stem, from 60 cm. to 90 cm. in height. Leaves are large, lobed, toothed and alternate; flowers are large, and of a white, or silvery-grey color ; the capsules are smooth, crowned by a sessile stellate stigma, flattened slightly at both ends, and from .050 to .10 in diameter. A milky white juice is found in all parts of the plant, but the virtue of the plant is found principally in the capsules. A fixed oil is found in the seeds (oil of poppy seeds), which is free from any of the narcotic properties of the capsule or juice, in fact it is used in Europe for household and pharmaceutical purposes. This oil solidifies at 20° C.; it has a pale straw color and a pleasant, almond-like taste. This plant is extensively cultivated in India, Persia, Egypt and Turkey in Asia. Efforts have been made to introduce the opium poppy into England, France, the United States, Australia and some other countries, and while a fair, and, in some cases, a good quality of opium was obtained, it was found that it did not pay to raise it, probably on account of the high price of labor.

Indian opium, at first semi-liquid, is allowed to drain and dry by spontaneous evaporation until thirty per cent of the moisture, only, remains. It is then taken to the government factories where it is worked with the drainings, poppy petals and the ground poppy plant into balls, or, as they are called, "cakes," which measure about 0.15 in diameter.

Persian opium occurs in different forms, either in pieces .088 long and .012 in diameter, wrapped in paper and weighing about 15 gm., in short cones, weighing from 175 to 300 gm., or in flat, circular cakes. It is of a liver-brown color, very bitter taste, and a disagreeable musty odor.

Egyptian opium is seen in flat, roundish cakes of various sizes up to 0.15 in diameter, and weighing about 1000 gm.; usually they are much smaller; they are wrapped in poppy leaves. This variety of opium is more brittle than Smyrna, and is uniformly hard throughout the mass. The color is nearly black (a bad color for opium), sometimes more red than Smyrna. It usually contains about half the amount of morphine found in Smyrna, hence it is of much less value. The value of opium is in the percentage of alkaloids it contains, of which there are nineteen, besides two acids, meconic and lactic (combined with the alkaloids); besides these we find two neutral principles (meconin and meconoiosin), pectin, glucose, mucilage, wax and fatty and coloring matters.

The principal alkaloids are morphina, codeina and narcotina.

Morphina is the one great alkaloid of opium and was the first one discovered, it being first isolated by Serturner, in 1807, in Germany. It is found in opium as a meconate and a lactate, and is obtained by treating the infusion containing the meconate and lactate with alcohol and water of ammonia. The alcohol retains the coloring matter, wax, etc.; the ammonia combines with the acids and the morphine falls as an insoluble precipitate. The alkaloid morphine is rarely used as a therapeutic agent, the salts, sulphate, hydrochlorate and acetate being more convenient on account of their ready solubility. The salts are prepared by treating the alkaloid with one of the three acids, sulphuric, hydrochloric or acetic. The sulphate is the one most commonly used. It is in the form of white, feathery, acicular crystals, having a silky lustre. They are unalterable in the air, and contain 11.84 per cent of water of crystallization, without odor; the taste is very bitter. They are soluble in twenty-four parts of cold water, in 0.75 parts of boiling water, in 700 parts of cold alcohol, and in 144 parts of boiling alcohol. The solution in water is not permanent, but deteriorates on standing.

Codeina is the second important alkaloid of opium. It is prepared by treating a solution of the mixed hydrochlorates of

morphine and codeine with ammonia, the former alkaloid being precipitated, and the latter obtained from the solution by evaporation and crystallization. It is in the form of creamy white, translucent, rhombic prisms, permanent in dry air, but efflorescent when heated, having no odor, but a slightly bitter taste; soluble in eighty parts of cold water and seventeen parts of boiling water; freely soluble in alcohol, ether and chloroform. Therapeutically it is a sedative.

Narcotina, the third alkaloid of some value to us, is white, tasteless, inodorous, silky, flexible needles, usually larger than the crystals of morphine. Insoluble in cold water; soluble in 400 parts of boiling water, 100 parts of cold alcohol and twenty-four parts of boiling alcohol; freely soluble in ether. It has no narcotic properties, but is rather anti-periodic in its action. The proportion of narcotine varies in the different varieties of opium. Smyrna opium has been found to contain from 1.5 per cent to 9.5 per cent of this alkaloid.

The other alkaloids of opium are of no clinical value as yet, so we will not consider them at this time.

Preparation.—The process for procuring opium from the poppy capsules is the same, according to the best authority, as it was 1800 years ago. A few days after the flower falls, and while the capsule is yet green, men and women go to the fields and make incisions across the side of the capsule, care being taken not to puncture the capsules. A white juice exudes which, after twenty-four hours, is scraped off, and in the state of an adhesive, rather granular jelly, is then beaten up in a vessel and moistened with saliva. This mass is then packed in one of the shapes previously described and sent to market.

Therapeutic actions.—Stimulant narcotic, sedative, analgesic, hypnotic, sudorific—to check secretions.

[To be continued.]

IS IT A VEGETABLE TOXICUM?*

By Dr. J. C. Meyers, Sr.,
Cincinnati, Ohio.

My attention was attracted by a report in the daily papers of a disease, apparently caused by poison, among dairy cattle in a suburb of Hamilton. As the papers stated, twenty-five out of a herd of sixty died.

Being interested, I telephoned to a regular veterinarian of Hamilton, but nothing further could be learned, as he was not the veterinarian in charge. I was inclined to believe that some infection or contagion might be the motive for keeping the affair secret, to prevent interference from the sanitary police. As it is the duty of the Live Stock Commission to investigate and prevent the spreading of transmissible diseases, my son, assistant State veterinarian from this disteict, being unable to go, and immediate action being necessary, I was requested to look into the matter.

On the morning of December 18th, 1893, I arrived at the dairy farm. Notwithstanding my haste, I was much too late to find any trace of the source of this outbreak, and was obliged to be satisfied with anamnestic reports. This was not surprising to me, however, as it is customary, whenever anything likely to create alarm occurs in a dairy establishment, for the manager to arrange it so that outsiders cannot learn too much, and really such precaution is excusable policy.

The owner and one of the attending practitioners who happened to be present willingly showed me the five animals still on the sick list. Credit must be given Dr. H., an empiric, in that he did not overdose his patients with digitalis, belladonna, aconite, etc., which were administered; on the contrary, he undoubtedly rendered efficient service, by reason of his being cognizant of the efficacy of these drugs.

One cow, an Alderney (under treatment by another doctor), was found in a comatose condition, which might have given rise to the suspicion that the animal was influenced by

* Paper read before Ohio State Veterinary Medical Association, September, 1894.

narcotics, had I not known that her palsy-like manifestation was a frequent sign of toxical diseases. This Alderney had been sick thirteen days, and could not get up since the fourth day. She lay on the right side, and we may say was motionless. Upon touching the eyeball she showed but little reaction, her sight seemed to be impaired and the corneas had lost their lustre. The buccal membrane and tongue were ashen grey and besmeared with a greasy looking mucus. Respiration 12, circulation 56 and scarcely perceptible, peristalsis very feeble, slightly tympanitic. This cow died on the following day. Post-mortem examination fourteen hours after death :—Carcass rigid, not tympanitic. Upon dividing the abdominal covering, the blood-vessels discharged black, semi-liquid blood, the gas emitted from the abdomen was of an extremely bad odor ; no serum escaped from this cavity, nor from the thorax. Bowels looked bluish, contents greatly diminished, soft and of a disagreeable smell. Rumen filled with half-masticated hay, notwithstanding the cow refused all but liquid nourishment, with which she was drenched for nine days. Mesenterium spotted with ecchymoses between its leaves, perhaps one half dozen in number, and ranging in size from a pea to a cherry. Reticulum occupied by a handful of greyish mushy food. Omasum, which was diminished in circumference, was nearly empty, only a few cakes ready to fall apart were found ; the epithelium which still adhered to its leaves was of a dark brown color. Abomasum greatly contracted, mucosa besmeared with about one-half pint, semi-liquid, greyish, offensive compound. Small intestines also contained much less than usual, the color and consistency resembling yeast. Spleen reduced in size, its surface ashen grey, pulp of a somewhat purplish tinge. Liver also diminished, flabby, of a putrid odor and soft, approaching decay. Gall-bladder two-thirds full of bile, molasses-like in appearance. Kidneys a trifle softer, both substances united in color, appear melanæmic. Fatty tissue was nowhere to be found. The exterior and interior of the heart of a dark reddish aspect ; its ventricles and auricles thoroughly filled with dark-purplish, coagulated blood. There was a scarcity of blood everywhere else. The lungs were the best preserved organs ; the right lobe slightly darker colored, front end looked rather fleshy, but would float. Being obliged to meet another engagement, I could not remain any longer, consequently the

skull and spinal cord, which might have furnished a solution to this problematic question, were not opened.

The nourishment, consisting of gruel and flaxseed meal tea, and medicines, all of which the cow received in drench form for nine days, seemed to have the effect of ridding the reticulum, omasum and abomasum of accumulated food, for the stomachs, as stated above, were nearly empty, and looked as if they were washed out. The rumen, on the contrary, was so full of coarsely masticated hay that it might have been called overloaded, notwithstanding the fact that not a particle of solid food had been added to it since the cow got down.

A remarkable feature, to me, was the contrast between the fullness of the rumen and the emptiness of the other three stomachs. Why the contents of the rumen were not more softened is also singular, but Professor Pott informs us that the liquid which ruminants drink, enters first into the reticulum and from there into the rumen, and the rest, by means of the œsophageal groove into the omasum and abomasum. When the animal is capable of a full swallow, which is from 500 to 700 grams, the greater part will flow into the first two stomachs. Judging by the above explanation, the rumen in this case did not receive its share, as in drenching the swallows are small, in fact it is doubtful whether the cow was able to swallow at all, as the pharyngeal muscles are commonly paralyzed in cattle afflicted thus, when drinking is impossible, but liquid food, if carefully administered, will reach its proper destination.

Another, cow, 4 years old, of Holstein breed, was thin in flesh, as most of her companions; had not eaten anything much since she first took sick ten days before; a foam-like saliva dripped from the mouth; eyes squinted, bulbus nearly normal. Coughed often and forcibly. Respiration 16, circulation 50, vesicular murmur a little heavier and plainer. Stood and moved about without showing much weakness. When standing the muscles of the posterior extremities trembled, which was not perceptible when lying down, nor could any pain be detected by palpatating that region. Discharge from bowels regular, but in small quantities. Appetite improving. Rumination had not yet set in, nor had the production of milk. The other three animals had so far convalesced that therapeutics were discontinued, judicial care being considered fully sufficient to restore them.

At the outset I suspected contagion or infection to be the agent of this loss, but the symptoms failed to verify such a supposition, consequently the cause must be attributed to the food, consisting of corn, cornstalks, hay and malt, which the cattle had been fed on some days prior to their taking sick.

Dr. H. claimed the hay could not have been better, but as the cattle had not received any for a week or more they ate hastily, not chewing it properly. The malt, which was all consumed, had been stored through the summer, and may have been defective. The stableman did not consider the cornstalks faulty, but allowance must be made, as these people do not attach much importance to quality.

I was suspicious that the stalks, not a vestige of which was left, were tainted with Ustilago Maidis, the poisonous fungus generally hidden either in corn, cornstalks, meadow-grass or hay, which, when eaten, is very apt to attack the sensorium and spinal cord almost simultaneously with the ganglion nerves, developing such ailments with but few if any premonitory signs.

These cattle, together with another lot, were watered from the same creek, and not one of the latter took sick, a proof that the food alone was responsible for the harm done.

Dr. H.'s description of some of the symptoms of the cattle which died within the twelve hours, is as follows: "They would become wild and frantic, break chains and ropes with which they were tied; rear, plunge about, fall down; roar, bawl and moan piteously, and discharge a dry manure every little while until death relieved them."

We are aware that these symptoms are not characteristic. some of them are often exhibited in suffocation brought on by tympanitis. But Dr. H. says that none of the animals under his charge were tympanitic enough to produce suffocation.

If I had had but one case to judge by it would have been a difficult task to find criteria upon which we could depend, but when three, four and more turn up with similar symptoms they may be diagnosed as related to ustilago poisoning.

Prof. Froehner's "Toxicologie for Veterinarians" contains a description of symptoms and post-mortem results, caused by Ustilago Toxicum, which corresponds with cases I have several times had opportunity to observe, leading me to believe that this malady belongs in the same category. Froehner

claims that the opinion prevailing to some extent, that the entrance of the poisonous spores into the blood takes place in a physical manner, is erroneous; but that it is effected by the formation of a ptomain-like body, which, besides irritating the mucous membrane, has the additional property of paralyzing the pharynx and spinal cord. In order to satisfy themselves as to the certainty of the death of cattle, upon eating Ustilago Maidis, a few experts made trials with this parasitic fungus, but instead of producing death, as was the case in those cattle which partook of it accidentally, the gestative organs were influenced to such a degree that abortion followed.

According to the results of these experimental attacks upon the system, it appears that under certain, as yet inexplicable, circumstances the gestative organs are more susceptible to the poisonous virus than the sensorium and its membranes.

CANINE DISTEMPER, ITS CAUSES, SYMPTOMS, SEQUELS AND TREATMENT.*

By Dr. W. E. Wadams.

Mr. President and Gentlemen:—The subject I have chosen for my essay is one, I think, much overlooked by the veterinary profession, for the simple reason that the majority of practitioners consider "canine practice" of small importance and not sufficiently remunerative for the time and trouble expended; but, be that as it may, it is a source of considerable income to me, for I find that men who own dogs valuable enough to treat do what they can cheerfully for their pets, and are willing to pay reasonably for the effort.

At one time I was inclined to believe, from the numerous forms distemper assumes, that there was really no such distinct disease, but that a variety of complaints had been ignorantly jumbled together under a term which affords no distinguishing mark by which to test its separate existence. But

* Read before the California State Veterinary Medical Association.

closer observation has enabled me, I think, to seize the clue, which explains all these apparent discrepancies, and also leads the way to the scientific treatment of this sometimes unmanageable disorder.

I began my investigation by considering what symptoms invariably attended upon distemper. At first I was completely puzzled, for I found in one series of cases nothing but cough and discharge at the nose and eyes, in another these symptoms were absent, and their place supplied by head symptoms and fits, whilst again in the third set the dogs all suffered from diarrhœa, with discharges of blood, and had neither head nor chest symptoms in any stage of the disease. In all these cases, however, I found there was fever, and that of a peculiar kind. This was not like the ordinary feverishness which dogs are subject to, and which attends upon almost all their acute attacks, but of a low typhoid character, with great exhaustion, loss of appetite, and in the latter stages a collection of brown fur, or as it is called in human medicine, "Sordes," about the teeth.

I have come to the conclusion that a protracted case of distemper is nothing more nor less than typhus fever, and in the word typhus might be found the key to the anomalies so puzzling to all inquirers into the nature of the malady.

It seems strange that such men as Dr. Jenner, James Woodruff Hill, Forrest and others did not think of this fact and, if so, have failed to mention it. Their experience in vaccination proved a failure, and this is the universal opinion of all modern professional men who have given it a trial. Everyone, however, must recollect numerous instances in which a simple clue once seized will explain all differences or difficulties.

The points of similarity between distemper in dogs and typhus fever in man are so strongly marked that a treatise upon the latter is all that is wanted to enable anyone who understands medical terms or phrases to treat distemper; or, as I call it, typhus fever, with the greatest probability of success.

I know full well that this disease is looked upon by many with contempt and as a loathsome disease, but we are here to treat all domestic animals, and why should the ailments of our faithful friend, the dog, be omitted? His care and treatment belong to our profession and demand attention, and in years to

come the treatment of the true friend, the dog, will be sought by the professional man instead of ignored as unworthy of his attention.

How many practitioners are there who do not despise the dog as a patient and hate to be called upon to treat him? But for my part give me a man who loves or appreciates the value of his dog, and I can invariably satisfy its owner, replenish my exchequer and do some good to the poor though despised dumb brute.

The old adage still remains, and that is, "'Tis only a dog," and poor old Watch, Rover or Spot is left to die or get well, as the case may be, starve or freeze after years of faithful service.

Symptoms.—I define distemper in the dog as a fever of a nature similar to typhus, and always followed by these symptoms:

There is first a dullness and restlessness, with partial loss of appetite, heat and dryness of the nose, rapid but feeble pulse, dull eye, the white of which is generally streaked with dark red blood-vessels, and the dog seems to be extremely sensitive to cold. The urine is scanty and high-colored, there is considerable thirst, the bowels are either costive or loose; if the latter, often of a pitchy color, the flesh and strength fail in a remarkably rapid manner, so that in less than a week the dog is unable to stand; the appetite by that time is entirely lost, and frequently the food which is given by force is returned or speedily passed through the bowels unchanged. The respirations generally become quicker than natural, though this symptom is not as universal as others I have mentioned. In fact, all the processes of respiration, circulation, digestion and secretion are disturbed in a remarkable degree; in this I believe is the essence of the disease, and the healthy return of these functions is always an indication of convalescence: the blood is no longer depurated properly by the agency of the lungs, liver and kidneys, nor renewed by healthy materials, the result of good digestion.

The circulation, consequently, is imperfectly carried on, and the brain is supplied with impure blood which is full of matters acting as a poison to it, and as a consequence death often takes place at an early date from a fit. Whatever secretions are affected are vitiated in quality and altered in quantity, sometimes being almost stopped, occasioning the dry, husky cough

and constipation of the early stage; and sometimes in excess where you have the profuse offensive discharge from the nose and bronchii, or the pitchy discharges from the intestines which accompany the progress of the disease. Such are the general and characteristic symptoms of the disease.

The local complications involved in this complaint may be enumerated as follows: First, the affections of the chest; second, of the liver, stomach and bowels; third, the kidneys; fourth, of the brain and nervous system; fifth, of the skin. Each trouble is represented by the usual phenomena pertaining to said organs.

Etiology.—The most common cause of distemper is no doubt infection, but it is occasionally epidemic, and then most probably depends upon some condition of the air. But it also seems to be the natural tendency of all debilitating diseases in young dogs to run on into this typhoid type.

Whether the disease is common catarrh or influenza, or inflamed liver or lungs, or even the irritative fever of worms or teething, in all these cases the tendency seems to be to put on the form of low typhus, and this is especially the case when dogs are ill-fed or crowded in poorly ventilated kennels, or in fact submitted to any of the ordinary predisposing causes of typhus fever in the human subject. And this disease once established, soon spreads to all within the reach of its influence. The infection seems to be carried by dogs after their convalescence. I have frequently known a severe attack supervene upon the contact with a puppy in the slips which was sufficiently recovered to run, though of course not in a fit state for such an exertion.

The kennel also seems to retain the infection for a long time, it being most probably absorbed in the urine, etc.

The walls, etc., should be well washed with chloride of lime or some other disinfecting fluid. After the dogs are removed, some time should elapse before they are replaced by others.

Dogs seem to be particularly liable to distemper when approaching maturity, the greater number being attacked between nine and eighteen months old; but in the typhus fever of man it is not confined to that age. The suckling and the old dog are also open to its attack, though in a much less degree.

As in the human being again, one attack generally, though not always, preserves the individual from another attack.

Indeed the laws of contagion and the statistics of the two diseases are precisely the same, making allowance, of course, for the difference in the time of coming to maturity and reckoning age in the dog by months and in the man by years, so that a dog twenty-one months old may be considered as mature, as a man of twenty-one years of age.

Period of Incubation.—This disease, like typhus fever, requires from ten days to two weeks after infection before making its appearance.

Duration.—Distemper varies in the length of attack from a few days to two or even three months ; but the average period, like that of typhus fever, is twenty-one days.

Diagnosis.—In the mildest form, distemper is very often mistaken for ephemeral fever or influenza. Severe distemper is most likely to be confounded with hydrophobia, from which it may be distinguished either by the absence of all aberration of intellect, or by the difference of the form of its manifestations. In distemper there is no restlessness, or at all events only a tendency to change the posture, whilst the hydrophobic dog is always on the watch, and eyes every one with a wild, suspicious gaze. The distempered dog is certainly nervous, but only from fear, while the hydrophobic dog knows neither fear nor pain, and will also resist to death any threats or actual punishment.

If the brain is much affected in distemper, there is almost always a fit or paralysis, neither of which occurs in hydrophobia ; and, lastly, the distempered dog eats nothing, while the hydrophobic animal has a depraved appetite, and devours any filthy material which comes in his way.

Distemper is liable to be confounded with any of the inflammatory diseases which attack the brain, lungs, liver, stomach, or kidney, but in the simple inflammation of any of these organs there is not the extreme and speedy emaciation and loss of strength noticed always in distemper.

Treatment.—The management and remedies used in this disease must vary with the stages of the malady, and must necessarily be considered under four heads, viz.: The periods of incipiency, reaction, typhoid and convalescence. The incipient stage is, I am sure, treated with more success in the following manner than any other : Put your puppy or dog, as the case may be, in a comfortable, warm, well-ventilated place,

avoiding, of course, a damp or dark cellar; a good dry bed and clothing, if in a cold climate. Give a puppy 10 months old the following:

℞ Hyd. Chlor. Mite . . . . . grs. ii.
Pulv. Rhei C. . . . . ʒj
Soda Bicarb . . . . . grs. xxx.
M. ft. pulv. Put in six capsules.
Sig. Give one every two hours until all are taken.

At the same time put ten grains of the hyposulphite of soda to each pint of water the dog takes. Feed on boiled milk, soda crackers and a little well-cooked mutton, it being easier digested. The stomach will bear more mutton than any other meat. Many men advise oatmeal, but from an extensive experience, both in treating this disease and many others, I find oatmeal too loosening unless combined with a sufficiency of wheat flour, and as the bowels have generally a tendency to relaxation, we cannot be too careful; but I must here remark that to a healthy dog, Scotch oatmeal is his greatest support.

The period of reaction, I may say, commences the moment a local symptom shows itself, and it is at this stage that the greatest difficulty in treatment arises. The chief complications that draw our attention now are the chest, the abdomen and the head. The skin complications are of minor importance, except as a sign of the severity of the attack.

We will now take up the chest, uncomplicated with any affection of the bowels.

No, gentlemen, with all due respect to my superiors, I am antagonistic to all. Dr. Stonehenge, Dr. J. W. Hill, Dr. Jenner and numerous others claim tartar emetic as their sheet anchor. I claim it a dead letter.

In chest complications I want to lower the temperature and keep up the strength, owing to the debilitating influence of the disease. To dose we must use our knowledge of materia medica, and this is my conclusion, after considerable experience in the treatment of this disease, with a fair knowledge of the above-named book:

I take my temperature, and if I find a high one, I give a toxic dose of quinine, say ten grains; put in a hot bath and rub dry, then blanket, and if not relieved in eight hours I blister the sides with cantharides, muzzling the dog at the

time ; then I give the following prescription, being always particular in its administration :

℞ Pulv. Digitalis . . . . . grs. vj.
Pulv. Pot. Citrat . . . . . ʒjss.
Ext. Glycerrhyzae . . . . . ʒj
Syrupi q. s.
M. F. mass et divide in capsules XII.
Sig. Give one every four hours.

If the animal does not improve on this treatment, and seems to lack recuperative powers, I begin a stimulating treatment, feeding beef tea, mutton broth, and raw eggs beaten up with milk.

The abdomen is generally the seat of severe intestinal disorders, the principal being diarrhœa accompanied with pitchy discharges. I invariably treat this complication with small quantities of calomel, one-sixth of a grain ; prepared chalk, ten grains, or sub-nitrate of bismuth and turpentine emulsions, always remembering that if any intestinal disturbance is due to intestinal parasites, to remove them as soon as possible, using the mildest remedies on account of the irritable condition of the alimentary canal ; areca nut for the tænia family, and oil of wormwood for the lumbricoids.

The head symptoms are generally a severe complication, especially if attended with chorea. I put a seton in the back of the neck, put tincture iodine and tincture cantharides along the spine, every other day, for two applications, and give internally the following :

℞ Strych. Sulph . . . . . grs. j.
Ext. Gent. q. s.
M. F. mass. Divide into fifty pills and put in capsules No. 50.
Sig. Give one night and morning after feeding, gradually increasing the dose until four a day can be taken.

Typhoid Stage.—Watch your patient carefully, as this is the stage which I believe indicates the essence of the disease known as distemper, and unless the dog has been evidently submitted to the contagion, it cannot be pronounced to have had the distemper.

I give the following tonic three times daily :

Quinine, one grain, port wine, one-half ounce, or cod liver oil one-half ounce, and tincture chloride of iron ten minims,

controlling the bowels with sub-nitrate of bismuth ten grains, and sulphate of morphia one-fourth of a grain, every four or six hours, as occasion requires.

Use injections of starch and such food as will be easily digested, and be sufficiently nourishing to maintain the strength of the patient.

Now, Mr. President and gentlemen, I thank you kindly for your patience and attention, and I sincerely hope that this essay may elicit some discussion.

The subject, I am aware, is obnoxious to many, but in the future will undoubtedly benefit the whole profession, for as the dog is bred, so are the requirements of the veterinarian in demand.

This simple essay, although not so technical, pathological, or flowery as some, is in my own experience based upon facts. I hope this may hold up, support, or in some way benefit the poor but faithful companion of man, the dog.

PURPURA-HEMORRHAGICA.*

By Dr. James W. Sallade.

Synonymy.—Eruptive fever, petechial fever, anasarca.

This is a non-contagious, febrile disease, of an intermittent nature. It is not a specific fever, but rather a secondary fever produced by dead material from suppurating surfaces and the material (a substance resembling glue or jelly) contained in the tissues, giving rise to a serious disturbance in the vaso-motor system which governs the circulation in the small arterioles and capillaries. The capillaries of the skin and mucous membranes are especially implicated; they become congested with blood, which exudes through their walls, causing characteristic phenomena.

Symptoms.—In the first stages of the disease the symptoms are very variable. In some instances the earliest symptoms may be pain, and slight swelling in one or more legs, or in some other part of the body, unaccompanied by pain: or our

* Paper read before the Schuylkill Valley Veterinary Society.

attention may be drawn to the fact that the animal is not thriving, that he doesn't seem to relish his food, that he appears stiff and sluggish, or is not convalescing as rapidly as he should. Upon examination we may find small purple spots upon the Schneiderian membrane. Without any other evidences, this condition is positive proof of the existence of this disease, but the appearances and local lesions vary so much in gravity and location, and the constitutional phenomena are so variable, that the true disease is often masked. At first, the pulse is usually normal, the temperature but little elevated and the appetite good, but after two or three days the temperature rises to 102° or 103°, frequently to 105°; the pulse now labors at seventy or eighty per minute, the appetite is variable and swellings appear upon different parts of the body, usually on the surface of the legs, lips, sides of the head, fore arms or under surface of the belly. These swellings are seldom hot, are somewhat sensitive, and are distinctly circumscribed from surrounding healthy tissues. Thus the swelling in the hind leg ends abruptly, as if a cord had been tied about the limb. These swellings are due, as already stated, to a congestion of the capillaries and smaller blood-vessels of the skin, owing to a paralysis of the vaso-motor system, followed by an extravasation of blood into the areolar tissue, and the transudation of serum and feebly coagulable lymph. The swellings rapidly increase, the animal is rendered stiff by the swelling of the legs, and frequently stands rooted to the ground; or he is disinclined to move, and shows pain by lifting one leg after another. The swelling may affect one or all legs at the same time, and it often leaves one limb to appear in another, or leaves all to appear in the head, which often swells to an alarming size. The swelling may extend from the nose and lips backward to the throat, giving rise to difficult breathing by closure of the nostrils or pressure upon the larynx. The dyspnœa may be so great as to threaten suffocation. Some purplish spots in the Schneiderian membrane gradually assume a brownish or blackish color, and coalesce to form large blotches, which frequently exude a very dark blood. The swelling of the head often interferes with the movements of the tongue and jaws, prevents the animal from eating, and increases the already marked debility of the disease. There may be œdema of the lungs, terminating in asphyxia. Colicy pains indicate that the bowels

are involved. I have had cases in which there was swelling or œdema of the throat and dyspnœa without any external swelling being visible.

Causes.—In the great majority of cases purpura occurs as a sequel of some debilitating disease, such as influenza, but in most cases it is directly traceable to bad ventilation or bad drainage. Overwork during convalescence from such disease, while the nervous system is yet in a debilitated condition, is also an exciting cause. Exposure to cold, especially to draughts of cold air, when the animal is heated, may cause the disease, yet with proper ventilation and drainage these latter conditions more frequently give rise to pneumonia or pleurisy. In the majority of cases the hygiene of the stable is directly responsible for the malady. Of course, the effete material contained in the system, the condition of the blood and vaso-motor system, or its action on the same, render the animal prone to its development.

Terminations.—Resolution. This is the most favorable as well as the most frequent termination, and may be looked for at the end of the third week, the animal being ready for light work at the end of the month. Resolution is brought about by the absorption of the effusion and by profuse diuresis.

Metastasis.—The dropsical swellings often disappear from one part of the body to reappear in another; this is a dreaded complication. As long as the swellings are confined to the external surface of the body, and do not involve the head and neck to a great extent, no danger may be apprehended; but when they suddenly disappear from the legs and under surface of the body, more especially during the first week or ten days, and the animal shows colicky pains or labored breathing, the case becomes apprehensive. Diarrhea tinged with blood, a suppressed, deep, hollow cough, a discharge of ropy blood from the nostrils, all indicate that the swelling has gone to the internal organs, and that the horse is threatened with death from either asphyxia or enteritis, or, perhaps, from effusion into some serous sac. In pulmonary œdema the parenchyma of the lung is affected, and the horse dies of asphyxia.

Excessive Suppuration.—This frequently ends in gangrene of small areas, which crack and slough, leaving ugly fissures and ulcers. The exudation beneath the skin exerts so much pressure on the tissues that they are unable to resist its force;

sweating takes place over the swollen area of the skin, vesicles form upon the lower parts of the limbs around the surfaces of flexion of the tendons, cracks and fissures appear from which an unhealthy, amber-colored discharge issues, the skin sloughs as do also the subjacent tissues, and the case terminates fatally from exhaustion.

Peritonitis may be produced either by the enteric œdema, or by the perforation of the walls of the viscera by gangrenous spots.

Septicæmia is another frequent termination of the disease. It is ushered in by severe rigors, sudden rise of temperature, great debility and coma.

Death may be produced by closure of the nostrils or the glottis, by asphyxia, hemorrhages, enteritis, exhaustion.

Post-mortem Appearances.—The post-mortem lesions are very simple. The capillaries are dilated, the connective tissues filled with a cinnamon-colored exudate which separates the muscles, fills and stretches the meshes of the connective tissues till they are distended like a sponge. Dark spots are found on the muscles, which when cut into are found to be but superficial. The pleura, pericardium, endo-cardium, meninges of the brain and other serous membranes are covered with petechial spots. Upon the exterior are found abscesses, ulcers and gangrenous spots. If there is œdema of the lungs, these organs are distended, the bronchi and trachea are filled with dark-colored fluid, and the mucous membrane is studded with purple spots.

Prognosis depends upon the complications. Though the case may look formidable, with proper accommodations it may terminate favorably; yet it is best to be on the safe side, and for the first week or ten days to be guarded in our prognosis.

Treatment.—A requisite for the successful treatment of this disease is to provide favorable hygienic surroundings. Impure air, offensive odors, bad drainage and poor ventilation are the chief causes of the disease. The mortality will be great or small in proportion to the wisdom we exercise in this direction. I have treated a great many cases of purpura, and can safely say have lost but very few of them, although many have been so weak and debilitated that it was necessary to raise and support them in slings. My first endeavor is always to secure proper ventilation (an open shed preferred), comfortable

clothing, pure water and proper drainage. The next step is to regulate the disordered circulation and give tone to the vaso-motor system. To this end I administer twice a day the following ·

Pulv. chlorate of potash	1 oz.
Spts. of turpentine	1 oz.
Spts. of camphor	2 dr.
Linseed oil	6 oz.

Mix.

This I give night and morning and a dose of dilute nitric acid, about one dram, at noon. I watch the case closely, observing the action of the medicine upon the bowels and kidneys, and renew these doses as often as the conditions will safely permit. The turpentine is given to stimulate the heart and circulation and to produce diuresis ; the chlorate of potash acts as a liberator of oxygen and as an antiseptic ; the camphor stimulates the vaso-motor system and depresses the pneumo-gastric, thus increasing the circulation and raising arterial tension, while the oil acts as a laxative. I prefer nitric acid to sulphuric acid, generally recommended, because the former increases the secretions and is a good tonic while sulphuric lessens them. However, where an astringent is required at a point remote from the stomach as, for instance, in hemorrhages from the kidneys or bowels, sulphuric acid may be substituted. By this treatment absorption is promoted, the excretions increased, the circulation stimulated, in fact, the entire system aroused so that the weakened organs renew their functional activity and the processes of tissue change are quickened. I generally continue to give the acid and camphor throughout the entire course of treatment. Where there is soreness of the throat, I give one-dram doses of tincture of the chloride of iron, and two-dram doses of the chlorate of potash in the solution. I also employ, with the best of results, bichromate of potash in nearly all of my cases, giving it internally in minute doses several times a day, and externally in very weak solution as a wash for the swollen parts. I find that it has a special stimulating action on the lymphatic system.

External treatment.—I do not believe in interfering much with the swollen parts beyond what has been already said. If the swelling about the head becomes excessive, bathing it with a weak solution of bichromate of potash (twenty grains to a

pint of water) is all that is necessary. Denuded surfaces, sloughs, etc., should be washed and disinfected. Tracheotomy may become necessary when mechanical asphyxia is threatened, but I never yet had a case where I deemed it necessary, although I have had them gaping pretty hard for breath. Where there is wheezing, and slobbering or frothing at the mouth, I find that a smart blister of red iodide of mercury applied to the throat gives speedy relief. If, however, dyspnœa is due to closure of the nostrils or of the glottis, this alone may not avail. However, I am almost egotistical enough to assert that, if called in time, and the general rules laid down in this paper are followed there will be no such serious complications. At the first sign of internal complications such as pawing, labored breathing, etc., apply a mustard plaster over the chest and belly of the animal. The peripheral irritation set up by the sinapism draws the current of the circulation to the exterior, stimulates the nervous system snd prevents metastasis to the lungs and intestines.

Hygiene, as already indicated, is a most important factor in the treatment of this disease. I prefer to keep constantly before the animal a liberal supply of fresh, pure water, changing it frequently. I allow any kind of food the animal will take and that the stomach is able to digest—let it be clean and pure, but do not allow it to accumulate in the manger or the horse will grow sick of the very sight of it. Milk is very good food, and you may find it necessary to administer milk, eggnog, whisky, etc., as well as medicine per rectum. Always bear in mind that it is, after all, food that gives permanent tone and strength to the tissues.

TRANSLATION.

NAVICULAR ARTHRITIS.*

By A. Lungwitz,
Principal and Instructor of the Shoeing Department of the Royal Veterinary School, at Dresden, Germany.

Case I.—A well bred saddle-horse, aged twelve, began to favor the near fore leg in the winter of 1892–93. The owner believed the cause to be a slight corn situated in the angle of the sole of the inner half of the foot; therefore the shoes were removed and the hoofs prepared for going bare-foot. The owner rode the animal during the winter in the covered riding academy, and in the summer out in the open, very often upon paved streets and seldom at a walk. The horse was an exceptionally fast and persistent trotter. In the spring of 1893 it was shod and ridden out-of-doors, and a short time afterward was brought to me lame to be examined, when I made the following notes: The fore limbs, viewed from in front and from the side, were normal in direction and well formed. At a trot, there was marked lameness in the near fore leg, equally upon hard or soft ground, but at a walk no abnormality could be observed in the action of the limb or in the length of the stride, and a closer examination of the leg and hoof revealed nothing. The hoof was well formed, and apparently free from pain under tests applied to the navicular region and coffin joint. The result of an examination of the limb from the hoof upward was absolutely negative. I then had the animal taken upon sand and driven in a circle, to the right and to the left, that I might observe the action of the shoulders, but found nothing abnormal. The shoe (bar-shoe with screw-calks, leather sole and padding) was then removed, and the hoof again carefully examined after removal of all dead horn from the sole, bars and frog, yet, except a yellowish-red discoloration of the solar horn near the "buttress," absolutely nothing was found to account for the lameness. When driven bare-foot, the quarters

* Translated from *Der Hufschmied* of November and December, 1894, by John W. Adams.

were set to the ground a little sooner than other portions of the plantar surface. Raising the sound right foot, thereby throwing greater weight upon the left, revealed a slight hypersensitiveness of the latter, inasmuch as every time the right foot was released it was noticed that the quarters of the left foot were loosely placed on the ground and the fetlock was somewhat more upright than usual. This symptom led me to observe his conduct when compelled to bear his weight for a time upon the lame leg, the fetlock-axis of which was broken, first backward and then forward, by a wooden wedge which was shoved first under the toe and later under the heels. While the toe was elevated by the uderlying wedge (breaking the fetlock-axis backward) the animal leaned heavily backward, and, as soon as the right foot was let down, lifted the left foot and placed it upon a level surface; but while the heels were elevated by the wedge (the fetlock-axis being broken forward) the animal seemed comfortable, and, on releasing the right leg, made no attempt to move the left.

From these symptoms the seat of the lameness was located in the ligamentary apparatus posterior to the phalanges. However, I did not succeed in making an exact diagnosis, especially as there was an entire absence of symptoms of inflammation, and both hoof and limb in comparison with the sound leg furnished no clue. To be sure, I was suspicious of chronic navicular disease, but, in the absence of the usual symptoms, was unwilling to commit myself. I had higher screw heel calks placed on the shoe, the latter nailed on again, and ordered bathing with cold water. After eight days the lameness had almost entirely disappeared, and the owner rode the animal as before. The gait, however, was not entirely clean.

Several months later this horse was taken with colic, and died of rupture of the stomach. I purchased the foot which had been under treatment. It was shod with the shoe and frog-pad of Arnstein & Martin, of Berlin. The dissection of the foot revealed a roughness of the inferior surface of the navicular bone, and two small excavations about a pin's head in size; the surface of the tendon, which was opposed to the roughened cartilage of the navicular bone, was hyperæmic and no longer quite smooth. Diagnosis: Chronic navicular disease.

I am induced to published this case, because it demonstrates the difficulty, under certain conditions, of locating a lameness with absolute certainty, especially if it be chronic navicular disease. The case is of special interest, because with the exception of one symptom, namely, sensitiveness when the weight was shifted to the lame leg while its fetlock-axis was broken backwards, all the characteristic symptoms of chronic navicular arthritis were absent, such as: traveling on the toe, shortening of the latter half of the phase of contact of the foot with the ground, narrowing of the hoof, sensitiveness under pressure upon the body of the frog, under squeezing together of the quarters, and under pressure on the flexor pedis perforans tendon deep in the hollow of the fetlock, between the heels. One would have supposed that the frog-pad and broad bar of the shoe would have aggravated the lameness, but apparently such was not the case. The owner paid $675 for the horse, and rode him five years.

Case II.—A saddle-horse, purchased during the summer of 1893 for somewhat more than $500, went lame in the right fore limb in the spring of '94. The infero-lateral tuberosities of the first phalanx being strongly developed and prominent, led the owner to suspect the presence of ring-bone. An examination revealed lameness at a trot, with marked shortening of the second half of the phase of contact; slight sensitiveness under pressure on the frog and in the lateral lacunæ, also when the hoof was pressed together from the sides at a point just beneath the coronary band; slight increase of heat around the coronet; pain on torsion of the foot, and when the body weight was put on the lame leg while its fetlock-axis was broken backwards. According to the owner the lameness had existed from two to three weeks, and was especially noticeable when the animal was ridden in a circle towards the right hand; the groom, however, said that he noticed that the gait was uneven immediately after the animal was purchased. I made a provisional diagnosis of sprain of the first and second interphalangeal articulations, and arrived later at a better understanding of the condition. First, the hoof was so shod that at rest the fetlock-axis appeared to be slightly broken forwards, then it was placed under continuous cold irrigation, and at the end of fourteen days the softened hoof was closely examined, and again after a second period of fourteen days. The increased

warmth had then disappeared, but not the other symptoms; on the contrary, the sensitiveness under pressue on the frog had greatly increased, owing doubtless to the increase in elasticity of the horn, as a result of the soaking. Meanwhile, private inquiries revealed the fact that this animal had previously favored the right fore foot intermittently for a considerable period. This fact, in conjunction with the permanent symptoms previously described, and negative results whenever the rest of the leg was examined, induced me to make a diagnosis of chronic navicular disease, and to advise the owner to get rid of the horse, since he would never again be useful as a saddle-horse. This was done, after the animal had been unsuccessfully treated for several weeks longer. The price realized was not quite $100.

Case III.—An elegant ten-year-old saddle-horse, well bred, properly built, faultlessly clean limbed, with good strong hoofs of normal form, was occasionally used for driving. One day it was brought to me lame. Upon examination, I discovered an inflammation of the podophyllous tissue of the outer quarter of the right front foot (moist corn). I was told that the animal had been lame in this leg for a short time, several weeks previously, and as it was supposed that the seat of the lameness was in the flexor tendons, they had been treated with light blisters and wrapped in bandages, yet the animal did not subsequently travel quite sound.

Under treatment, the inflammation of the podophyllous tissue of the quarter disappeared in about eight days, not the lameness however; this, indeed, was not so intense as before, yet it was so well marked that it was thought best not to put the animal to work. A second examination revealed slightly increased warmth along the coronary band entirely around the hoof. The first interphalangeal articulation was free from inflammatory symptoms and the result of an examination of the upper parts of the limb was negative. When the hoof was examined no symptoms that pointed to chronic navicular disease were found. The animal always stood straight, that is, he did not place the feet forward and did not constantly shift the weight from one to the other. It was impossible at rest to perceive any abnormal deviation in the position of the limbs; even the carrying of the limb was such as to excite no suspicion. Since pressure upon the frog by means of the pincers

was well borne, the hoof was shod with a bar-shoe, leather sole and padding. Subsequently, the horse traveled a little better, and every day the coronet was irrigated with water. In the course of four weeks, during which time the water treatment was continued, a slight improvement took place, yet the animal could not be worked. The owner had long before lost all patience and wished to discontinue treatment. Renewed examination was negative, for even the increase of heat at the coronet had then disappeared. A patent hoof packing was spread over the sole, but notwithstanding the strongly developed horn sole it could not be borne and had to be removed on the following day. The hoof was now raised at the heels, so that the fetlock-axis was strongly broken forwards, and for a few days the animal traveled better. I was now satisfied in diagnosing the condition as, *chronic navicular disease.* I then advised the owner to sell the animal, but instead he gave it to a farmer, for he believed that it would recover if put to work upon soft ground. After four months the horse died, and the hoof was handed over to me for dissection. The latter revealed disease of the lower surface of the navicular bone, and besides a slight redness of the cartilage, it presented an irregular, small excavation of the size of a small pea. The corresponding upper surface of the tendon was slightly hyperæmic, and some of the tendon fibres were ruptured.

This case also teaches that chronic navicular disease under certain conditions is very difficult to diagnose and requires several examinations.

Case IV.—A draft-horse, twelve years old, of medium weight, had chronic navicular disease in both fore feet. Nevertheless, the animal worked daily, either with a wagon upon country roads, or in the fields at the plough. The position of the fore limbs viewed from in front was normal, but viewed from the side both limbs were seen to be slightly in advance of the body. The hoofs had an almost perfect form and were strong. I observed this horse from time to time when it came to the shop to be shod, during a period of about six years. The symptoms of the malady were simple and very characteristic. The gait in front was stilty and short, especially after the animal had had several hours of rest ; then after traveling for a quarter of an hour the gait improved, that is, it became a little more free. At rest the fore limbs were

placed a very little in advance of their normal position, and the animal was constantly shifting the weight from one foot to the other. When observed in motion, it was readily perceived that the second half of the phase of contact of each foot with the ground was considerably shortened. The animal stepped very cautiously upon his toes, and as the body passed over the supporting limb, the foot was picked quickly from the ground, carried rapidly forward and placed cautiously, toe first upon the ground; otherwise there was little action in the gait, for both flexion and extension and also the setting down of the foot caused the horse decided pain. The hoofs were of equal width. It is impossible to say whether or not the hoofs of this horse were wider before the disease appeared, perhaps they were, but it would be without significance, for to a certain extent all hoofs become somewhat narrowed by being shod for several months. An examination with the hoof pincers revealed well-marked sensitiveness of the frog and under the lateral lacunæ, and somewhat less pain under squeezing together of the quarters. The flexor tendons of both fore feet were slightly swollen in the hollow of the fetlock just above the heels, and pressure at this point caused considerable pain. Increased warmth and strong pulsation of the digital arteries were felt after hard work for several hours, but disappeared after a short rest. Otherwise the fore limbs were sound, that is, did not present the least abnormality in form, circumference, position and temperature. The animal was shod for six years with heel calks, and rolling motion at the toe, because such a shoe seemed to suit better than any other.

Case V.—Two years ago a dealer in horses brought a six-year-old saddle-horse in a drove from Austria, and soon after sold him. After a short time, it may have been three months, the dealer brought the horse to me for examination. It had been returned to him on account of being stiff and short-gaited in front. The following conditions were present: Position of the limbs seen from in front were normal, seen from the side the feet were slightly in advance of the body, the fetlock-axis broken backwards, the form of the feet between normal and stumpy. The hoofs were normal, the sole was moderately concave and of normal width, and the frog was well developed. The horse was shod with flat shoes of even thickness at all points. The gait was short and without action. It was

necessary to urge him in order to make him trot, and when once going he resisted efforts to turn him.

A closer examination revealed evidences of pain on pressure upon the frog and in the lateral lacunæ, and upon squeezing together the quarters. He was tested with the wooden wedge, placed under the toe and afterward under the heel in order to break the fetlock-axis backwards and forwards, as previously described, and it was found that when the fetlock-axis was broken strongly forward the animal seemed to rest comfortably, but would not long tolerate the other position, that is, raising the toe and breaking the fetlock-axis backward caused unendurable pain. The shoe was removed, and the plantar surface of the foot well thinned with a hoof knife, but nothing abnormal was found ; the upper portions of the limb were also apparently normal.

Diagnosis:—Chronic navicular disease of both fore feet. The dealer afterward sold the horse for $37.50.

Case VI.—In the year 1893 Mr. S. purchased a saddle-horse in Berlin. Several days after the arrival of this horse in Dresden it was shod in the Shoeing Department of the Dresden Veterinary College. When trotted, the animal's gait was uneven, and there was sensitiveness in the fore feet on turning. The hoofs and legs were examined, but no definite knowledge as to the trouble could be obtained. This information was conveyed to the owner. After several weeks the owner informed me that he was unable to sell the horse, because, on trial, the prospective buyer (an officer) was convinced that the animal was lame, or at least not clean-gaited. The owner, Mr. S., then told me that he had sometime previously, while using the animal under the saddle, noticed an unevenness in his gait, but supposing it to be "bridle lameness," attached no importance to it. Since that time there had been many periods of days and even weeks in length, during which the gait was apparently perfectly clean. I was asked to give the animal some attention from that time on. I did so, and the next time the animal came to be shod, diagnosed *chronic navicular disease* of the right front foot. Thereupon the owner tried unsuccessfully for several months to induce the seller to take the animal back, and finally succeeded, after procuring a certificate confirming my diagnosis, from an official of the Royal Veterinary School.

Since I had an opportunity to observe this animal during a period of more than six months, I was enabled to see the variations in the symptoms of a lameness, which was sometimes better, sometimes worse. The animal was exercised in the covered riding academy, where at first he was quite lame, but improved in the course of his work until even an expert could detect nothing wrong. This was followed by a period of intense lameness which did not improve upon exercise. The right hoof, although narrower than the left, did not evince hyper-sensitiveness under pressure with the pincers, but did under the test with the wooden wedge. During an examination conducted by myself, shortly before the animal was sent back to Berlin, I was able to detect the disease in the other foot as well.

Case VII.—Upon a horse of my own, which I purchased at four and one-half years old, I noticed very soon after that the left front hoof was narrower than the right. The animal stood slightly "base wide," and, observed from the side, his feet were somewhat stumpy, that is, steeper at the toe and heels than is normal. I rode and drove the animal for two years, and did not notice during this time any lameness, yet I was not entirely satisfied with his gait. The fore hoofs, of perfect base-wide form, with thin inner walls and well developed frogs, bars normal in form and direction, were, however, proportionately too weak for the weight of the body, as was indicated by the formation of rings upon the inner walls, in spite of regular food and care, shoeing with a leather sole in summer and Hartmann's rubber foot-pad in winter (to prevent balling with snow).

A crack at the coronary band, between the side and the quarters of left hoof, present when the horse was purchased, healed well. What was especially annoying to me in his gait, when under the saddle, was a short, cautious setting down of the foot in traveling over hard country roads and asphalt; and as this appeared later, soon after a shoeing, even when ridden over soft ground, a visible narrowing of the hoof made me suspicious of chronic navicular disease, although a careful examination failed to reveal any of its other symptoms. What I found was a slight breaking backwards of the fetlock-axis, and a prominence of certain small lymph vessels upon the fore arm, which to this day I am unable to explain. The defective

axis of the fetlock was corrected by proper shoeing, and the animal traveled better.

Later the defective gait became more pronounced, the horn of the hoof became dried out and hard, and I had a linseed meal poultice applied to it continuously for two days. The next time the horse was shod with a bar-shoe, leather sole and padding, and this manner of shoeing was continued to the end of the past winter. With these shoes the animal traveled perceptibly better, much better in fact than he had done with any other shoes. With each shoeing the posterior half of the right hoof grew wider, but the left remained the same.

During the past winter, on account of the absence of snow, I did not use Hartmann's rubber foot-pad, but at one time I did use a patent foot-packing to prevent balling with snow. This packing could not be borne by the left foot, and the next day the animal came from the stable lame. Besides a slight swelling of the subcutaneous tissue from the hoof to the middle of the canon, there was well-marked sensitiveness under pressure upon the frog. Upon the other foot, however, the hoof-packing apparently caused no inconvenience. I now had no doubt but that the animal was afflicted with *chronic navicular disease* in the left fore foot. A course of cooling treatment with rest caused some improvement, yet the symptoms of chronic navicular disease did not entirely disappear, and I soon after sent the animal to the country.

I could relate many other cases, but this is unnecessary, for none of them furnish anything that is new. The six cases related are sufficient, in my opinion, to demonstrate that navicular disease in its first stages is often very difficult to diagnose.

From my own observations I am satisfied that, in the beginning of the disease, all characteristic symptoms may be absent except the lameness, or a certain unevenness in the gait. However, since it is of economic value to diagnose chronic navicular disease as early as possible, I am induced to strongly recommend that valuable means of diagnosing the seat of the disease, namely, the "testing-wedge." This testing wedge has always given me satisfaction, and now I would not wish to do without it.

I may be allowed further, as a result of my experience, to suggest why it is that horses with chronic navicular disease do

not always react under pressure upon the frog of the bar of a bar-shoe, while they usually do react under pressure of any firm foot-packing which lies in intimate contact with the sole and the frog. In years gone by, the application of a bar-shoe as a means of diagnosis was almost universal, and I can well remember that the deceased Professor Haubner was especially fond of this particular test. I have noticed that this shoe, in the beginning of the disease, will nearly always increase the lameness if the bar be so placed that it presses strongly upon the body of the frog; and this can be attained if the border of the quarters be lowered before the shoe is nailed on. In cases where a bar-shoe does not increase the lameness, the reason will usually be, partly that the pressure of the bar on the frog is not great enough, and partly that this pressure is not over the sensitive region. According to the rules of shoeing, the bar of a proper bar-shoe presses not on the body of the frog (portion between median cleft and summit of frog), but on its branches, and in such a manner that the frog bears but a part of the weight distributed over the quarters; there is, therefore, no necessity for lowering the quarters further than to allow the branches of the frog of the uplifted foot to just touch the bar of the shoe. A firm hoof-packing, on the contrary, does and must increase sensitiveness of the foot, because not being solidly united to the shoe, any small and hard elevation of the ground, as a stone or stick, upon which the animal treads, or stands for any length of time, pushes the hoof-packing upward and exerts great pressure on the body of the frog and on the sole. Many horses with thin soles cannot bear a hard hoof-packing, even if their feet be sound.

In old cases of navicular disease, all these means of diagnosis are, of course, not needed, since, besides the lameness, there are always such well-marked symptoms as pain on pressure over the body of the frog, and over the perforans tendon in the hollow of the heels, so that no doubt need be felt as to the nature of the disease; indeed, the character of the lameness, in the almost entire absence of local symptoms, may be sufficient to warrant a diagnosis.

The prognosis is very unfavorable; indeed, I have never known a cure.

Treatment.—This may be attempted, but can do no more than to ameliorate the symptoms, and possibly to retard the

process somewhat. It is entirely unjustifiable to continue for a long time to treat any animal having this disease. Such an animal is serviceable only for light work, and may remain so for many years, if the hoof be kept in good condition and properly shod. By proper shoeing, I mean such as will take strain from the perforans tendon, and cause the momentum of the body weight to be received as far as possible by the third phalanx, rather than by the navicular bone. This may be accomplished by raising the heels of the hoof upon calks or thickened branches; if, at the same time the heels are contracted, ears may be drawn up on the branches to press against the bars (Defay's Shoe). The hoof should not be allowed to become too dry.

ABSTRACTS.

HERMAPHRODISM IN A BULL.

The animal, which was two years of age, was regarded as a true monorchid and, for this reason, was slaughtered. The autopsy showed genital organs of both sexes.

He was a male from the external genital organs, but only one testicle was found in the scrotum. No male organs were found in the pelvic cavity, for the other half of the body, but, instead, female organs, represented by an ovary and an imperfect uterus.—*Annales de Méd. Vét.*, January, 1895.

OSTEOMALACIA IN CATTLE.

M. J. Rognard, a veterinarian in Vienna, has for several years studied this disease which has been enzootic in certain regions and has destroyed a large number of cattle. The disease could not be attributed to an absence of water or to dryness since the meadows are low and marshy. The soil was covered with grasses which were undergoing decomposition. It is the plants of these prairies which are defective in the ingredients necessary for the nutrition of the bones, and it very often sufficed to transfer the diseased animals to pastures upon higher ground to cause a disappearance of the disease in the course of several weeks. In the season of 1893, which was very dry, the hay was very poor in salts and the disease again was very prevalent.—*Répertoire de police sanitaire vétérinaire*, December, 1894.

CAUSES OF THE INSTABILITY OF AQUEOUS SOLUTIONS OF BICHLORIDE OF MERCURY.

M. Burcker, from his experiments, has drawn the following conclusions :

1. That ordinary water, from the principles which it contains, causes immediate decomposition of bichloride of mercury, and that this decomposition continues under the combined

influence of light and air, as well as of the mineral and organic ingredients contained in the water and carried by the air.

2. That the decomposition having commenced will be arrested, or at least become insignificant, when the solution is removed from action of light and air.

3. The dissolution of the bichloride of mercury prepared with the pure distilled water is subject only to very insignificant decomposition even when exposed to light and air.—*Rec. de Méd. Vét.*

TREATMENT OF CARTILAGINOUS QUITTOR.

A. Miachaud, in treating necrosis of the lateral cartilages of the foot, soaks the foot in a bath containing some potash for four days. He then enlarges and cleans out the fistulous opening with a probe-pointed bistoury. When the hemorrhage is arrested a small tampon of oakum, on which is sprinkled corrosive sublimate, is inserted into the tract. This tampon remains there for forty-eight hours; it is then removed and the necrosed parts are washed off and the fistula is injected with the following preparation:

Corrosive sublimate	16 grams
Alcohol	120 "
Hydrochloric acid	10 gtts.
Sub-acetate of lead	32 grams.

At the commencement two injections are made daily; later only one daily. If several fistulous tracts exist each one is treated in the same manner: after each injection the region is covered with an antiseptic dressing. The pus, abundant at first, diminishes rapidly and even disappears after fourteen to eighteen days.—*Rec. de Méd. Vét.*

PREVENTIVE TREATMENT OF CHOLERA IN POULTRY.

M. Filliatre experimented with the treatment of cholera in poultry, but with little success. He had recourse to a vaccine obtained at the Pasteur Institute. He vaccinated 250 animals, which died from septic gangrene some hours afterwards. He

then made a pharmaceutical mixture, which from a point of view of prophylaxis has given satisfying results, and is recommended by him.

Crystallized phenic acid	50 grams.
Methylic alcohol	50 "
Glycerine	20 "
Bichloride of mercury	.05 "
Distilled water	1 litre.

For the adult fowl two cubic centimeters are injected simultaneously; for the young, one cubic centimeter, and for the chick one-quarter of a cubic centimeter. The hen-house should be disinfected with a five per cent solution of phenic acid. The animal should be allowed to drink a solution of sulphate of iron, ten grams to the litre. It is not rare to see the mortality cease immediately.—*Rec. de Méd. Vét.*

SUMMER WOUNDS IN THE HORSE, DUE TO A STREPTOCOCCUS.

This case, mentioned by M. Ligniéres, was brought to the Alfort clinic. Various portions of the body were covered with ulcers, which at first simulated those of farcy. They commenced as small, hard, round enlargements, surrounded by vascular connective tissue, and even penetrated into the muscles. There was intense pruritis; the horse could not be harnessed, and became almost unmanageable. Cultures of the pus, the indurated walls of the ulcers, as well as of a portion of a tumor which had not ulcerated, upon bouillon, potatoes and gelatin, showed invariably a streptococcus in long chains. It was a little larger than the streptococcus pyogenes. The colibacillus, frequent in the colon of the horse, was present in the pus, but this was merely accidental.

Inoculations.—In the horse two cubic centimeters of the culture injected under the skin produced in forty-eight hours a phlegmonous swelling containing a serous pus not rich in anatomical elements. The coccus was demonstrated in the pus. Rubbing superficial wounds with cultures of the coccus was negative.

In the rabbit the same quantity of a culture injected subcutaneously produced no general symptoms, but provoked in seventeen hours at the point of inoculation a small nodule of

the size of a hazel-nut, containing a creamy, yellowish-white pus and surrounded by a thick, indurated wall. The pus produced upon gelatin cultures the same streptococcus.

The *treatment* consisted in enucleating the tumors, deeply curetting the wounds and applying alternately iodized glycerine and iodoform. Healing was obtained in less than fifteen days.—*Rec. de Méd. Vét.*

POTATOES FOR MILK COWS.

Cornevin, in experimenting upon the value of potatoes as a food for milk cows, has drawn the following conclusions: Fed upon raw potatoes cut up, without any other aliment, the daily increase of these cows was 7 per cent of their live weight. After this exceptional increase in flesh the milk increased in quantity, but their weight commenced to decrease. These two opposite conditions were very marked.

Boiled potatoes were readily eaten by heifers; when fed exclusively upon this diet, rumination ceased and digestion was disturbed. Potatoes, raw or boiled, mixed with other foods in proper proportion,[1] have been a good diet both for fattening and for the production of milk. Such a mixture is favorable to digestion, the coefficient of digestion is augmented, the nutritive relation and the assimilation of fats and proteids increased.

He fed two series of animals. In one case potatoes constituted one-half of their diet; in the other the diet contained only 22 per cent of potatoes. The former experiment gave the better results.

Other experiments proved that raw potatoes especially increased the flow of milk, while boiled potatoes increased the fat and weight. Under a diet of boiled potatoes the percentage of sugar in the milk increased, but did not continue when such diet was withdrawn.

During a period of four months a weekly examination was made of eight cows whose ration, for some, contained 40 kg. and for the others 20 kg. of potatoes. Cornevin observed the following results:

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[1] The nutrition ratio, 1 to 5, should be observed. (H.)

1. Decrease of the specific gravity and of casein and dry extracts.

2. Increase of the butter-fats and mineral salts.—*Oesterr. Mon. f. Thierheilkunde*, November, 1894.

CHEMICAL PROCESS FOR RECOGNIZING HORSE-FLESH.

All previous chemical processes for determining the presence of horse-meat have the disadvantage of being too complicated. M. M. Brantigam and Edelmann have recommended a new method by means of which the meat of the horse can be rapidly recognized. It is based upon the knowledge of the action of iodine upon glycogen which is always found in horse-flesh.

The procedure is as follows:

1. Fifty grams of meat, cut up into small pieces, is boiled for an hour in four times the same quantity of water. The bouillon thus obtained is treated as in paragraphs four and five. If the reaction with this process is not positive, the procedure indicated below can be followed.

2. A solution of caustic potassa of the same quantity as the above, the amount of potassa being three per cent of the quantity of meat used, is added to the latter, and the whole is then heated upon a water-bath until the muscular fibres are dissolved,

3. The bouillon thus obtained is evaporated to one-half of the quantity of water employed and then filtered.

4. After cooling completely, an equal quantity of dilute nitric acid is added to precipitate the albumen and discolor the liquid, and the filtration is repeated.

5. This filtrate is then treated with a saturated solution of iodine prepared with heat. The bouillon as prepared after paragraph one, is treated in the same manner after adding the solution of nitric acid and filtration.

The iodine solution is poured with great care upon the filtered liquid. If it be a question of horse-meat, there is formed immediately at the point of contact of the two liquids a dark-red circle almost bordering on violet. The intensity and the thickness of this red circle depend upon the quantity of horse-meat and the richness of the latter in glycogen.

This reaction the authors were able to obtain only in cases of horse-meat ; it was always absent with the meats obtained from other animals, such as the ox, pig, calf, sheep, dog, cat.

The authors believe that in this manner horse-flesh in different mixtures to which it is added fraudulently, such as extracts of beef, sausages, canned meats, can be detected, and they have obtained the characteristic reaction in preparations containing no more than 5 per cent of the meat of the horse.—*Annals de Méd. Vétér.*

PROCEEDINGS OF SOCIETIES.

KEYSTONE VETERINARY MEDICAL ASSOCIATION.

The December meeting of the Keystone Veterinary Medical Association was held at 3452 Ludlow street, Philadelphia, on the evening of December 11. President Lintz called the meeting to order. On roll call by Secretary Rhoads, the following members responded to their names: Drs. Bridge, Cullen, Hoskins, Lintz, John R. Hart and Rhoads.

As visitors—Drs. Thomas B. Rayner, F. S. Allen, H. T. George and J. T. McAnulty.

The report of the Board of Trustees was called for, and they reported the financial standing of the members now carried on the roll. After further discussion on the subject, the secretary was instructed to proceed to collect the various sums of indebtedness of the members and report at the January meeting.

The special committee to appoint essayists for the various meetings and those who were to report cases was adopted, and the secretary was instructed to notify these members of their appointments.

A revised bill looking to the establishment of a Live Stock Sanitary Commission in Pennsylvania was then presented, together with an appeal for support of the same, and after some discussion the Association indorsed the bill.

The subject of "Azoturea," which had been assigned for this meeting, was then considered, and cases were reported by Drs. Bridge, Allen, Cullen, T. B. Rayner, McAnulty, Lintz and Hoskins. The value of purgatives was discussed and a difference of opinion as to their value was expressed. The need of some remedies to produce diaphoresis was urged on the grounds that we always find the skin attempting to assist the kidneys in the eliminating from the body effete products which are essential to a successful termination of the case, and as it always seems to act more promptly than the bowels, its assistance seems to be indicated as a very desirable means of a more successful ending of these cases.

Dr. James T. McAnulty's application for associate membership was received, and was referred to the Board of Trustees to report at the January meeting.

Some general discussion followed, after which the meeting adjourned.

W. L. Rhoads,
Secretary.

CALIFORNIA STATE VETERINARY MEDICAL ASSOCIATION.

San Francisco, Cal., December 12, 1894.

On the above date the California State Veterinary Medical Association held its annual meeting at the Baldwin Hotel.

The meeting was called to order by the President, Dr. H. A. Spencer.

Upon roll call, the following named gentlemen were present: Drs. Maclay, Spencer, Sr., Wadams, Orvis, Fox, Archibald, Pierce, Jackson, Robin, Fabbi, Forrest, Williams, Graham, Eddy, O'Rourke, and Hogarty.

The minutes of the previous meeting were read and approved.

The annual reports of the secretary and treasurer were received and placed on file.

The Board of Examiners were granted further time on the application of Dr. J. H. Edmons.

The Legislative Committee through their chairman, submitted the following report:

MR. PRESIDENT AND GENTLEMEN: Your Committee on Legislation beg leave to submit the accompanying bill for your consideration and adoption; further, we would recommend the adoption of the following resolution:

Resolved, That the bill as reported be presented at the next session of the Legislature, and that said committee be and they are hereby empowered to watch the progress of said bill through the Legislature. All of which is respectfully submitted.

[Signed] THOMAS MACLAY,
C. B. ORVIS,
H. A. SPENCER,
R. A. ARCHIBALD.

The secretary read the bill, whereupon, on motion by Dr. Fox, the report was adopted.

The secretary moved that we have 500 copies of the bill printed in circular form and distributed among the members of the Association. The motion was duly seconded and carried.

The Committee on Clinical Entertainment reported that they had procured several cases for the entertainment. Upon motion the report was accepted and the committee granted further time.

Under the head of applications for membership, the secretary submitted the following names: J. R. Shaw, A. B. Wise, J. A. Edmons, J. Trullinger, J. J. Streets, B. W. Schodde, J. W. O'Rourke, S. A. Withers, A. J. Withers, E. J. Creely, and O. C. Baldy. The names were referred to the Board of Examiners.

The election of officers for the ensuing year resulted as follows: President, Dr. C. B. Orvis, of Stockton; Vice-President, Dr. R. T. Whittlesey, of Los Angeles; Secretary, Dr. R. A. Archibald, of Sacramento; Treasurer, Dr. D. F. Fox, of Sacramento; Board of Examiners, Drs. Maclay, Egan, Spencer, Sr., Graham and Lemke; Board of Directors, the several officers of the Association.

The secretary presented a bill for ten dollars and forty cents for secretary's supplies, etc., which was ordered paid.

The secretary moved that when this Association adjourns it adjourns to meet in San Jose. The motion was duly seconded and carried.

Dr. Fox suggested the advisability of the Association endorsing some one of its members for the position of State Veterinarian. The matter was discussed in an informal manner by Drs. Spencer, Orvis, Fox, Pierce and the secretary.

During the discussion Dr. Maclay moved to adjourn for dinner. On the motion being put, the chair not being satisfied with an "aye" and "no" vote,

called for a rising vote which resulted in a tie, whereupon the chair cast the deciding vote in favor of the motion. The meeting then adjourned to meet at 7 p. m.

EVENING SESSION.

The meeting of the California State Veterinary Medical Association reconvened at 7 p. m.

It was called to order by the President, Dr. H. A. Spencer, who called upon the president-elect to take the chair.

The new President, Dr. C. B. Orvis upon taking the chair delivered a few appropriate and well chosen remarks, and as he was going to act in the capacity of an entertainer, he requested Dr. Spencer to take the chair for the rest of the evening.

Under the head of reading of papers, etc., and discussions, the chair called upon Dr. C. B. Orvis, to entertain the meeting, which he did by reporting three cases of intestinal obstruction from the formation of tumors and abscesses in the sublumbar region.

The reports were very interesting and instructive, and a very animated discussion followed their reading. The chair closed the discussion with a few appropriate remarks.

Dr. W. E. Wadams was then called upon to entertain the meeting, which he did by offering an instructive and exhaustive paper on "Canine Distemper."—(See Original Article.)

The reading of the paper was followed by a lively discussion which was participated in by Drs. Maclay, Archibald, Orvis, Eddy, Fox, Pierce, Fabbi, O'Rourke and Jackson. The chair closed the discussion with a few remarks, and then called for reports of peculiar cases.

The secretary reported a case of a cow whose milk contained so much acid that it was for all practical purposes useless. He said the cow had been changed from one food to another without changing the character of the milk. He also reported a few cases of what he supposed to be chronic pharyngitis and he said that in some localities the disease seemed to be very prevalent in the late summer and fall of the year.

Dr. Orvis reported some cases of actinomycosis and exhibited some specimens taken from the tongue of two cows showing the ravages of the disease, he said the cows were almost starved to death when he was called in to see them.

Under the head of new business, Dr. Maclay offered the following resolution:

WHEREAS, It has pleased the great Architect of the Universe to call from our midst one of our respected members, be it

Resolved, That in the death of Peter Burns this Association loses one of its most active members and most ardent supporters; as a man, as a citizen, as a husband and as a father he was beloved by all. Be it further

Resolved, That the heartfelt sympathy of the members of this Association be and it is hereby extended to the family of the deceased in this their hour of bereavement. Be it further

Resolved, That a copy of these resolutions be spread upon the minutes and a copy forwarded to the family.

Upon motion the resolution was adopted unanimously.

Dr. Maclay offered the following resolution:

Resolved, That the thanks of this Association be and is hereby extended Dr. H. A. Spencer for the faithful and impartial manner in which he has performed the arduous duties of the office of president during the past year.

Upon motion the resolution was adopted.

The secretary offered the following resolution:

WHEREAS, It has come to our notice that there are some members of this Association, and some who intend becoming members, who are violating Section I of the Code of Ethics which states "That no member shall assume a title to which he has not a just claim," Therefore, be it

Resolved, That it is the sense of this Association that any member who refuses to discard, or who in violation of the Code of Ethics adopts a title to which he has not a just claim, be expelled from the Association and have his name stricken from the roll of membership.

Considerable discussion followed, but finally on motion by Dr. Maclay the motion was adopted.

The chair appointed the following named gentlemen as essayists for the next meeting: Drs. Spencer, Sr., Faulkner, and Jackson.

On motion by the secretary a vote of thanks was extended to the essayists for the able and masterly manner in which they had entertained the meeting.

There being no further business to come before the meeting it adjourned to meet in San Jose on Wednesday, March 13, 1895.

On Thursday, December 13, 1894, at 9 a. m., the members of the California State Veterinary Medical Association assembled at Dr. J. W. O'Rourke's hospital at 331 Golden Gate avenue, San Francisco, to witness a Clinical Entertainment.

The first case was the extirpation of an actinomycotic tumor from the sublingual region on a cow. The operation was skillfully performed by Drs. Spencer and Fox.

The second operation was the removal of a melanotic tumor from the lumbar region of a horse, by Dr. C. B. Orvis.

The third operation on the program was the removal of the ovaries from a bitch, by Dr. F. E. Pierce.

The fourth and last operation was the removal of the left arytenoid cartilage and the left vocal cord for the amelioration of a condition called "Roaring" in a horse, by Dr. R. A. Archibald.

The entertainment was voted an entire success both as an instructive entertainment as well as an enjoyable one.

The members before adjournment, through the President, Dr. Orvis, upon the suggestion of Dr. Fox, extended to Dr. O'Rourke a vote of thanks for the use of his hospital and his kindness.

R. A. ARCHIBALD, V. S.,

Sacramento, Cal., December 14, 1894. *Secretary.*

VETERINARY LEGISLATION.

PENNSYLVANIA LIVE STOCK SANITARY COMMISSION.

THE PROPOSED ACT
TO
ESTABLISH A STATE LIVE STOCK SANITARY COMMISSION IN PENNSYLVANIA AND TO PROVIDE FOR THE CONTROL AND SUPPRESSION OF TUBERCULOSIS AND OTHER DANGEROUS DISEASES OF DOMESTIC ANIMALS.

SECTION 1.—*Be it enacted*, etc., That a Commission is hereby established to be known as "The State Live Stock Sanitary Commission." This Commission shall consist of five Commissioners, to be appointed by the Governor, as follows: the Secretary of the State Board of Agriculture, a practical breeder of live stock, the Secretary of the State Board of Health, and two competent and qualified veterinarians who are members in good standing in any legally chartered veterinary medical association of this State, or who are graduates in good standing of some recognized and reputable veterinary college. Each Commissioner shall be appointed for a period of four (4) years, and shall be subject to removal by the Governor for incompetency or neglect of duty.

SEC. 2.—It shall be the duty of the Commission to protect the health of the domestic animals of the State; to determine and employ the most efficient and practical means for the suppression, control or eradication of dangerous, contagious or infectious diseases among the domestic animals, and especially of tuberculosis; and for these purposes it is hereby authorized and empowered to establish, maintain, enforce and regulate such quarantine and other measures relating to the movements and care of animals and their products, the disinfection of suspected localities and the destruction of animals as it may deem necessary to prevent the spread and transmission of contagious or infectious diseases.

SEC. 3.—Whenever it shall be adjudged necessary to the interests of the live stock industry of this State or to the welfare of the public to kill an animal or animals suffering from some contagious or infectious disease and an agreement cannot be made with the owner or owners thereof as to their value, three appraisers shall be appointed, one by the owner or owners of the cattle, one by the Commission or a Commissioner, and a third by these two, who shall under oath or affirmation appraise the animal or animals at their actual value at the time of the appraisement, and the owner shall be paid one-half of the said appraisement; provided, that no such appraisement shall exceed fifty dollars for single unregistered cattle, or seventy dollars for single registered cattle, or forty dollars for a glandered horse or mule; and further, provided, that no animal or animals found to be infected with contagious or infectious disease within ninety days after having been brought from another State into Pennsylvania shall be paid for, but, notwithstanding, the Commission shall be authorized to slaughter such animal or animals if, in their judgment, such a course is necessary to the interests of the live stock industry or to the welfare of the public; and provided, that in case it shall be found, upon making the autopsy of an animal appraised and killed by order of the Commission or of a Commissioner, that such animal was not at the time of slaughter suffering from the contagious or infectious disease supposed to have been present, the entire appraised value shall be paid to the owner or owners.

SEC. 4.—The Commission, or any Commissioner, or any of their duly authorized agents shall at all times have the right to enter any premises, farms, fields, pens, buildings, cars or vessels where any domestic animal is at the time quartered, or wherever the carcass of one may be, for the purpose of examining it in any way that may be deemed necessary to determine whether they are or were the subjects of any contagious or infectious disease.

SEC. 5.—Any person or persons wilfully violating any of the provisions of this Act, or any of the regulations of the "Live Stock Sanitary Commission," or wilfully interfering with officers appointed under this Act, shall be deemed guilty of misdemeanor, and shall, upon conviction, be punished by a fine not exceeding one hundred dollars, or by imprisonment not exceeding one month, or both, at the discretion of the Court.

SEC. 6.—The Commission is hereby empowered to employ such assistants and agents, and to purchase such supplies and materials as may be necessary in carrying out the provisions of this Act, and to administer oaths or affirmation to the appraisers appointed under this Act.

SEC. 7.—The salaries of the Commissioners shall be fixed each year by the Governor.

SEC. 8.—For the purpose of this Act the sum of $50,000 annually is hereby appropriated.

SEC. 9.—This Act shall go into effect July 1, 1895, and all Act or parts of Acts inconsistent herewith are hereby repealed.

UNITED STATES VETERINARY MEDICAL ASSOCIATION.

The following appointments of the United States Veterinary Medical Association have been made by the President, and acceptance on the part of the appointees has been received:

President.—W. Horace Hoskins, 3452–54 Ludlow street, Philadelphia, Pa.

Vice-Presidents.—J. F. Winchester, Lawrence, Mass.; T. J. Turner, Columbia, Mo.; W. L. Williams, Bozeman, Mont.

Secretary.—Leonard Pierson, 2024 Pine street, Philadelphia, Pa.

Treasurer.—James L. Robertson, 409 Ninth Avenue, New York City.

Comitia Minora.—W. Horace Hoskins, president, 3452–54 Ludlow street, Philadelphia, Pa.; J. F. Winchester, vice-president, Lawrence, Mass.; T. J. Turner, vice-president, Columbia, Mo.; W. L. Williams, vice-president, Bozeman, Mont.; Leonard Pearson, secretary, 2024 Pine street, Philadelphia, Pa.; James L. Robertson, treasurer, 409 Ninth Avenue, New York City, *ex-officio*. A. S. Clement, chairman, 916 Cathedral street, Baltimore, Md.; Thomas B. Rayner, Chestnut Hill, Philadelphia, Pa.; F. H. Osgood, 50 Village street, Boston, Mass.; Olof Schwarzkopf, 1629 Wabash avenue, Chicago, Ill.; R. S. Huidekoper, 155 W. Fifty-sixth street, New York City.

Committee on Intelligence and Education.—C. A. Cary, chairman, Auburn, Ala.; W. B. Niles, Ames, Iowa; George C.

Faville, 46 Charlotte street, Norfolk, Va.; R. A. Archibald, Sacramento, Cal.

Finance Committee.—William Dougherty, chairman, 1035 Cathedral street, Baltimore, Md.; D. J. Dickson, 366 Washington street, Hoboken, N. J.; L. H. Howard, 1440 Washington street, Boston, Mass.

Committee on Diseases.—M. R. Trumbower, chairman, 502 Third avenue, Sterling, Ill.; M. H. Reynolds, St. Anthony Park, Minn.; S. J. J. Harger, 3608 Pine street, Philadelphia, Pa.; John Faust, 209 Union street, Poughkeepsie, N. Y.; R. R. Dinwiddie, Fayetteville, Ark.

Prize Committee.—Tait Butler, chairman, Agricultural College, Miss.; L. McLean, 14 and 16 Nevins street, Brooklyn, N. Y.

Army Legislation.—J. P. Turner, chairman, Fort Myer, Va.; W. B. E. Miller, 527 Penn street, Camden, N. J.; James A. Waugh, 101 North avenue, Allegheny, Pa.

Publication Committee.—A. T. Sellers, chairman, 444 Benson street, Camden, N. J.; Leonard Pearson, 2024 Pine street, Philadelphia, Pa.; James B. Rayner, West Chester, Pa.

Special Committees: Act of Incorporation.—William Dougherty, chairman, 1035 Cathedral street, Baltimore, Md.; J. C. McNeil, 26 Fourth street, Pittsburg, Pa.; F. S. Allen, 800 N. Seventeenth street, Philadelphia, Pa.

Revision of Constitution and By-Laws.—W. Horace Hoskins, president, 3452–54 Ludlow street, Philadelphia, Pa.; J. F. Winchester, vice-president, Lawrence, Mass.; T. J. Turner, vice-president, Columbia, Mo.; W. L. Williams, vice-president, Bozeman, Mont.; Leonard Pearson, secretary, 2024 Pine street, Philadelphia, Pa.; James L. Robertson, treasurer, 409 Ninth avenue, New York City, *ex-officio.* W. B. E. Miller, chairman, 527 Penn street, Camden, N. J.; S. Stewart, 7½ St. James street, Kansas City, Kan.; John M. Parker, 24 Essex street, Haverhill, Mass.

Resident State Secretaries.—C. A. Carry, Auburn, Ala.; R. R. Dinwiddie, Fayetteville, Ark.; J. K. Thompson, Pueblo, Col.; H. P. Eves, 507 West Ninth street, Wilmington, Del.; F. H. P. Edwards, Iowa City, Iowa; R. H. Harrison, Atchison, Kans.; James B. Paige, Amherst, Mass.; R. A. Ramsey, Mexico, Mo.; W. L. Williams, Bozeman, Mont.; H. J. McClellan, Lansdowne, Pa.

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